

Tennessee Comprehensive Assessment Program / Mathematics

TCAP/CRA PILOT 2012

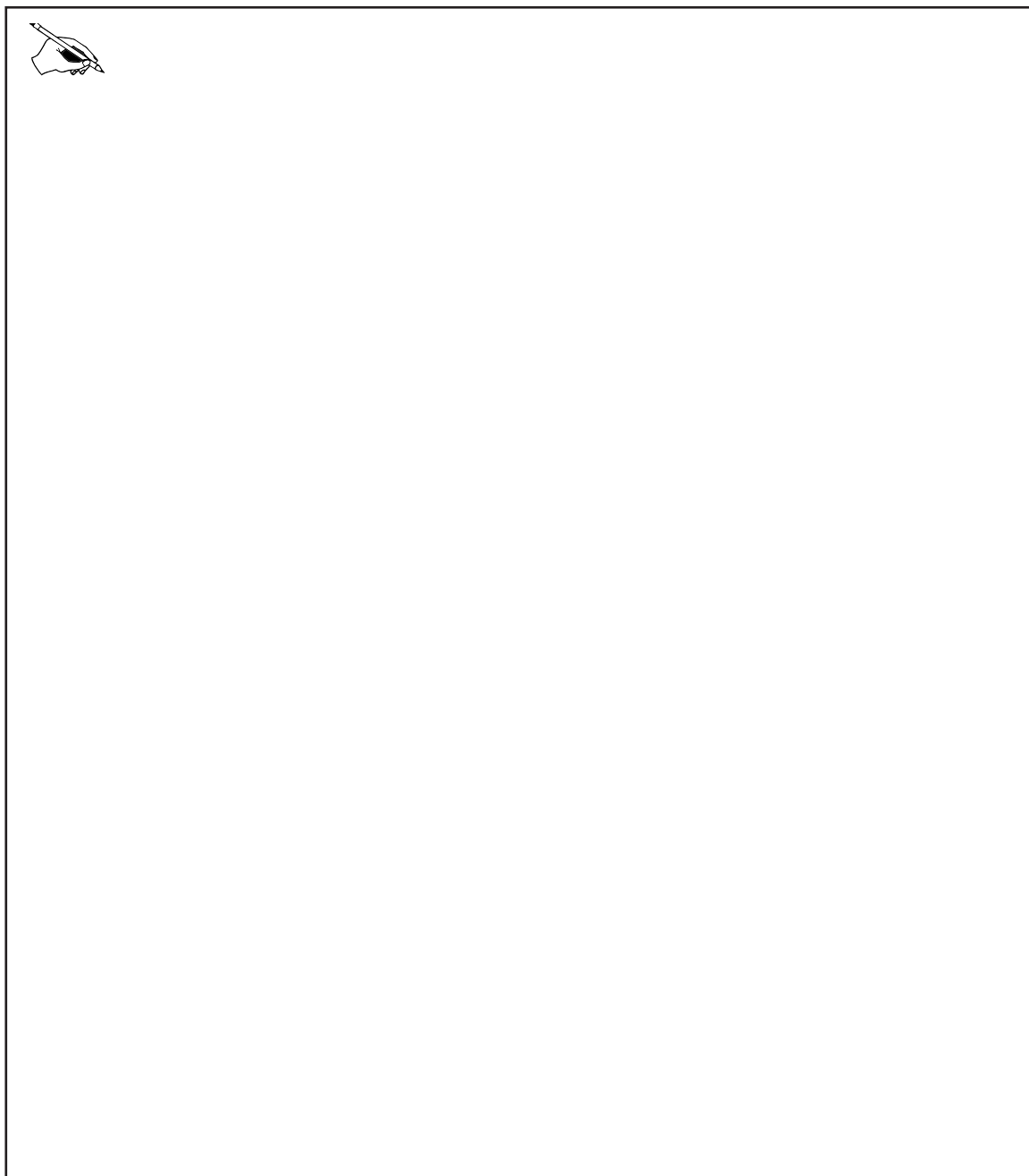


Task 3 : Stew Recipe Scoring Guide

Task 3. Stew Recipe Task

Molly's recipe for stew says to use $\frac{1}{4}$ pound of potatoes per person. Molly has 24 pounds of potatoes. Molly wonders if she has enough potatoes to make stew for all 36 people who will be at her party.

- a. Calculate $\frac{1}{4} \times 36$. Show how you determined the answer. What information can you get from the answer?



- b. Calculate $24 \div \frac{1}{4}$. Show how you determined the answer. What information can you get from the answer?



3. Stew Recipe Task Scoring Guide

The CCSS for Mathematical Content (2 points)

5.NF.4a Student calculates $\frac{1}{4} \times 36$. _____

- Recognizes that the 36 represents the number of people and the product, 9, represents the total number of pounds needed for the 36 people.
- Work may indicate that $\frac{1}{4} \times 36 = 9$.

5.NF.7b Student calculates $24 \div \frac{1}{4}$. _____

- Recognizes that the 24 represents the number of pounds of potatoes and the quotient, 96, represents the number of servings of potatoes that can be obtained.
- Work may indicate the use of the reciprocal of $\frac{1}{4}$ and multiplying by 24 to determine that there are 96 one-fourth servings in 24 pounds of potatoes.

Total Content Points _____

The CCSS for Mathematical Practices (3 points)

MP1 Student makes sense of the meaning of each expression within the context of the problem. _____

(MP1: Make sense of problems and persevere in solving them.)

MP6 Student attends to precision: _____

- Use correct labels on responses.
- Recognize that Molly needs 9 pounds of potatoes to feed 36 people.
- Recognize that the 24 pounds of potatoes will feed 96 people.

(MP6: Attend to precision.)

MP7 Work indicates that the student understands multiplication of a whole number by a fraction as the partitioning into parts of a given size, or recognizes division of a whole number by a fraction as it relates to a whole number multiplied by the reciprocal of the fraction. _____

(MP7: Look for and make use of structure.)

Total Practice Points _____

Total Awarded Points _____

The CCSS for Mathematical Content Addressed in This Task

Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.

5.NF.4a Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. *For example, use a visual fraction model to show $(2/3) \times 4 = 8/3$, and create a story context for this equation. Do the same with $(2/3) \times (4/5) = 8/15$. (In general, $(a/b) \times (c/d) = ac/bd$.)*

Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.

5.NF.7b Solve real-world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share $1/2$ lb. of chocolate equally? How many $1/3$ -cup servings are in 2 cups of raisins?*

The CCSS for Mathematical Practices*

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.


*Gray text indicates Mathematical Practices not addressed in this task.

Students' responses to a mathematical task provide evidence of what they understand and are able to do in relation to the standards and practices. Across tasks, this cumulative evidence shows students' understanding and abilities within a domain. When students do not respond completely to all parts of a task, they provide insufficient evidence of their mathematical understanding and abilities and therefore do not fully demonstrate the expectations of the standards and practices aligned with that task.

Task 3. Stew Recipe Task**Guide 1a**


Molly's recipe for stew says to use $\frac{1}{4}$ pound of potatoes per person. Molly has 24 pounds of potatoes. Molly wonders if she has enough potatoes to make stew for all 36 people who will be at her party.

- a. Calculate $\frac{1}{4} \times 36$. What information can Molly get from the answer?


$$\frac{1}{4} \times \frac{36}{1} = \frac{9}{1} = 9$$

It tells Molly how many pounds of potatoes are needed for 36 people.

- b. Calculate $24 \div \frac{1}{4}$. What information can Molly get from the answer?


$$\frac{24}{1} \div \frac{1}{4}$$

This tells Molly how many 1 person stews she can make.

↓

$$\frac{24}{1} \times \frac{4}{1} = \frac{96}{1} = 96$$

Guide 1

Litho 50033

Total Content Points: 2 (5.NF.4a, 5.NF.7b)

Total Practice Points: 3 (MP1, MP6, MP7)

The student solves for the correct product of $\frac{1}{4} \times 36$ and appropriately recognizes that it represents “how many pounds of potatoes are needed for 36 people” (5.NF.4a). The student solves for the correct quotient of $24 \div \frac{1}{4}$ and appropriately recognizes that it represents the number of people Molly can serve (5.NF.7b). The student correctly relates each of the given expressions to the context of this task (MP1). The student provides the correct solutions with the correct labels (MP6). While solving for the quotient of $24 \div \frac{1}{4}$, the student multiplies 24 by the reciprocal of $\frac{1}{4}$, showing recognition of the relationship between division of a whole number by a fraction and multiplication of a whole number by the reciprocal of the fraction (MP7).

Total Awarded Points: 5 out of 5

Task 3. Stew Recipe Task

Molly's recipe for stew says to use $\frac{1}{4}$ pound of potatoes per person. Molly has 24 pounds of potatoes. Molly wonders if she has enough potatoes to make stew for all 36 people who will be at her party.

- a. Calculate $\frac{1}{4} \times 36$. What information can Molly get from the answer?

$\frac{1}{4} \times 36 = 9$ pounds of potatoes will satisfy 36 people attending her party.

- b. Calculate $24 \div \frac{1}{4}$. What information can Molly get from the answer?

96 people could get satisfied with $\frac{1}{4}$ pounds of potatoes.

Guide 2

Litho 50225

Total Content Points: 2 (5.NF.4a, 5.NF.7b)

Total Practice Points: 3 (MP1, MP6, MP7)


The student's written explanation recognizes that 36 represents the number of people and the product, 9, represents the total number of pounds needed (5.NF.4a). The student also solves for the appropriate quotient and recognizes that it represents the number of servings that can be obtained by stating "96 people could get satisfied with $\frac{1}{4}$ pounds of potatoes" (5.NF.7b). The student appropriately states the meaning of each expression in the context of the task (MP1). The student correctly labels the responses, recognizing that 9 pounds of potatoes will feed 36 people and that 96 people can be fed from 24 pounds of potatoes (MP6). By mathematically explaining how the product of 9 pounds was attained, the student's work indicates that the student understands how multiplication of a whole number by a fraction relates to the partitioning of the whole number into parts of a given size (MP7).

Total Awarded Points: 5 out of 5


Task 3. Stew Recipe Task

Molly's recipe for stew says to use $\frac{1}{4}$ pound of potatoes per person. Molly has 24 pounds of potatoes. Molly wonders if she has enough potatoes to make stew for all 36 people who will be at her party.

- a. Calculate $\frac{1}{4} \times 36$. What information can Molly get from the answer?

 Molly now knows that to host 36 people she needs 9 pounds of potatoes.

- b. Calculate $24 \div \frac{1}{4}$. What information can Molly get from the answer?

 Molly now knows if she has 24 pounds of potatoes she can serve 96 people.

Guide 3

Litho 50022

Total Content Points: 2 (5.NF.4a, 5.NF.7b)

Total Practice Points: 2 (MP1, MP6)

The student solves for the correct product of $\frac{1}{4} \times 36$ and appropriately recognizes that it represents the amount of potatoes that Molly needs (5.NF.4a). The student solves for the correct quotient of $24 \div \frac{1}{4}$ and appropriately recognizes that it represents the number of people Molly can serve (5.NF.7b). The student appropriately states the meaning of each expression in the context of the task (MP1). The student provides the correct solutions with the correct labels (MP6). Since no work, appropriate explanations, or diagrams are provided, the student has not clearly demonstrated recognition of multiplication of a whole number by a fraction as the partitioning into parts of a given size (no credit for MP7).

Total Awarded Points: 4 out of 5

Task 3. Stew Recipe Task

Molly's recipe for stew says to use $\frac{1}{4}$ pound of potatoes per person. Molly has 24 pounds of potatoes. Molly wonders if she has enough potatoes to make stew for all 36 people who will be at her party.

- a. Calculate $\frac{1}{4} \times 36$. What information can Molly get from the answer?

$$\frac{1}{4} \times \frac{36}{1} = \frac{36}{4} = \frac{9}{1} = 9$$

If she has enough potatoes

- b. Calculate $24 \div \frac{1}{4}$. What information can Molly get from the answer?

$$24 \div \frac{1}{4} = \frac{24}{1} \times \frac{4}{1} = \frac{96}{1} = 96$$

The Max # of people she can make stew for!

Guide 4

Litho 50003

Total Content Points: 1 (5.NF.7b)

Total Practice Points: 1 (MP7)


The student solves for the correct product of $\frac{1}{4} \times 36$ but fails to provide a specific and accurate context for this solution (no credit for 5.NF.4a). The student solves for the correct quotient of $24 \div \frac{1}{4}$ and appropriately recognizes that it represents the number of people Molly can serve (5.NF.7b). Although the response shows the correct quotient and context for $24 \div \frac{1}{4}$, the student does not clearly identify the contextual meaning of $\frac{1}{4} \times 36$ (no credit for MP1). The student does not correctly label the product of $\frac{1}{4} \times 36$ (no credit for MP6). While solving for the quotient of $24 \div \frac{1}{4}$, the student multiplies 24 by the reciprocal of $\frac{1}{4}$, thereby recognizing the relationship between division of a whole number by a fraction and multiplying a whole number by the reciprocal of the fraction (MP7).

Total Awarded Points: 2 out of 5

Task 3. Stew Recipe Task


Molly's recipe for stew says to use $\frac{1}{4}$ pound of potatoes per person. Molly has 24 pounds of potatoes. Molly wonders if she has enough potatoes to make stew for all 36 people who will be at her party.

- a. Calculate $\frac{1}{4} \times 36$. What information can Molly get from the answer?



how many pounds of potatoes
she needs (9 lbs.)

- b. Calculate $24 \div \frac{1}{4}$. What information can Molly get from the answer?



The number of people they can
feed.

Guide 5

Litho 50148

Total Content Points: 1 (5.NF.4a)

Total Practice Points: 1 (MP1)

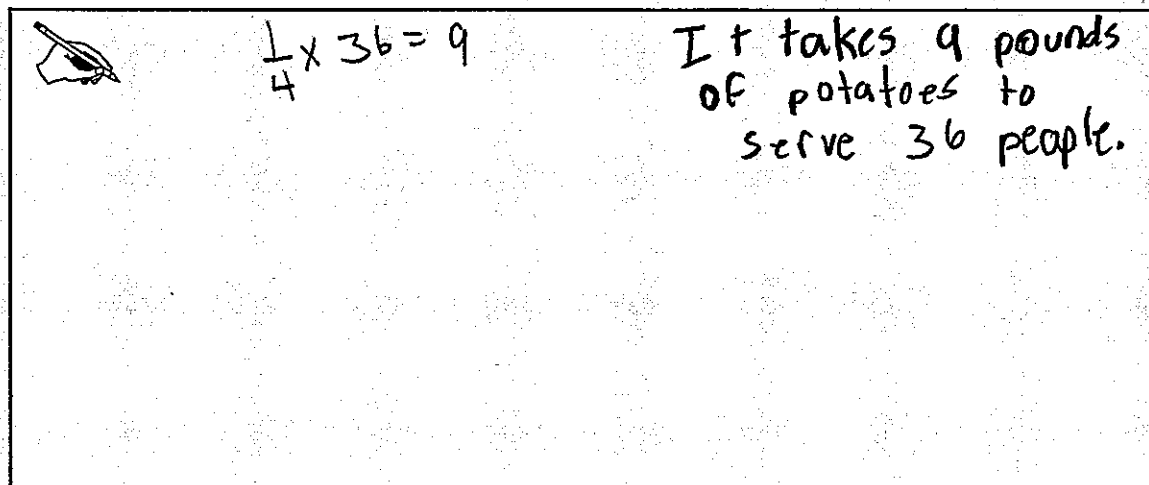
The student solves for the correct product of $\frac{1}{4} \times 36$ and appropriately recognizes that it represents the amount of potatoes that Molly needs (5.NF.4a). Although the student appropriately recognizes that $24 \div \frac{1}{4}$ represents the amount of people Molly can serve, the student does not solve for the correct quotient (no credit for 5.NF.7b). The student interprets the meaning of each expression correctly in the context of the task (MP1). The student does not recognize that 24 pounds of potatoes will serve 96 people, and he states an answer that lacks precision (no credit for MP6). Since no work, appropriate explanations, or diagrams are provided, there is no clear indication that the student understands multiplication of a whole number by a fraction as the partitioning into parts of a given size, or recognizes the relationship between division and multiplication (no credit for MP7).

Total Awarded Points: 2 out of 5

Task 3. Stew Recipe Task

Molly's recipe for stew says to use $\frac{1}{4}$ pound of potatoes per person. Molly has 24 pounds of potatoes. Molly wonders if she has enough potatoes to make stew for all 36 people who will be at her party.

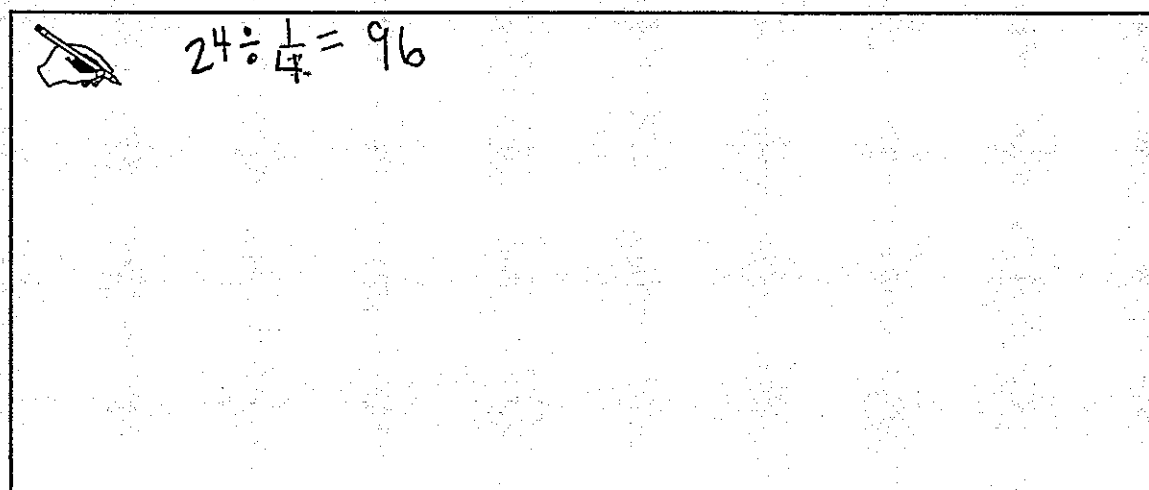
- a. Calculate $\frac{1}{4} \times 36$. What information can Molly get from the answer?



$\frac{1}{4} \times 36 = 9$

It takes 9 pounds of potatoes to serve 36 people.

- b. Calculate $24 \div \frac{1}{4}$. What information can Molly get from the answer?



$24 \div \frac{1}{4} = 96$

Guide 6

Litho 50008

Total Content Points: 1 (5.NF.4a)

Total Practice Points: 0

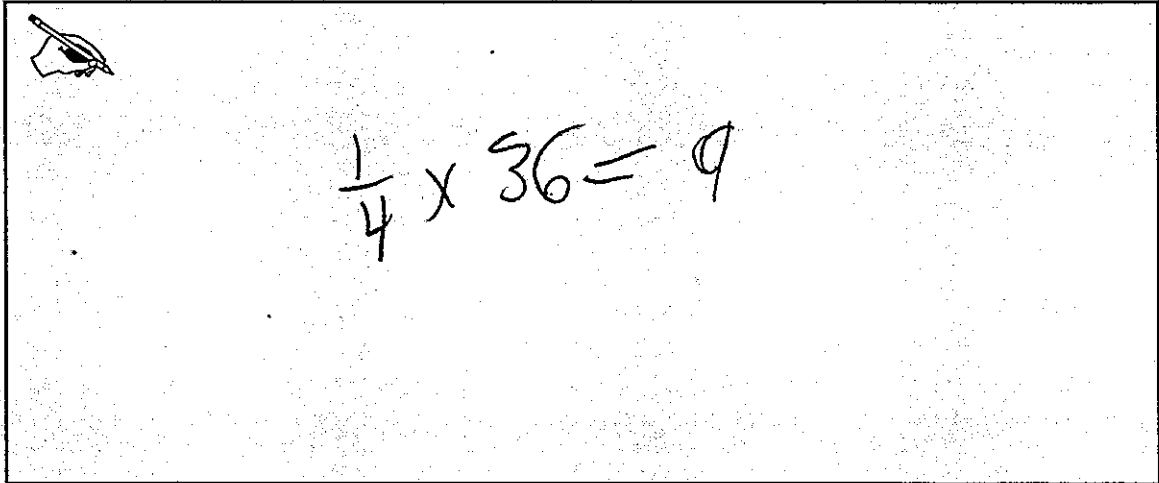
The student solves for the correct product of $\frac{1}{4} \times 36$ and recognizes the appropriate context of that solution as it relates to this task (“It takes 9 pounds of potatoes to serve 36 people”) (5.NF.4a). The student solves for the correct quotient of $24 \div \frac{1}{4}$ but fails to explain the context of that solution (no credit for 5.NF.7b). Although the student identifies the context of $\frac{1}{4} \times 36$, the student does not identify the contextual meaning or label the quotient of $24 \div \frac{1}{4}$ (no credit for MP1, no credit for MP6). Since no work, appropriate explanations, or diagrams are provided, there is no indication that the student recognizes the relationship between division and multiplication (no credit for MP7).


Total Awarded Points: 1 out of 5

Task 3. Stew Recipe Task

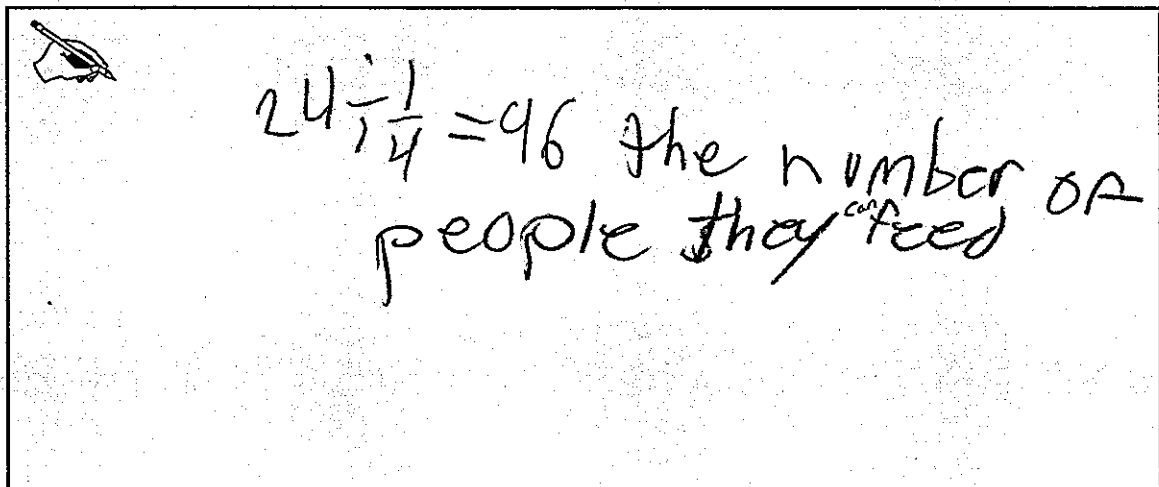
Molly's recipe for stew says to use $\frac{1}{4}$ pound of potatoes per person. Molly has 24 pounds of potatoes. Molly wonders if she has enough potatoes to make stew for all 36 people who will be at her party.


- a. Calculate $\frac{1}{4} \times 36$. What information can Molly get from the answer?



 $\frac{1}{4} \times 36 = 9$

- b. Calculate $24 \div \frac{1}{4}$. What information can Molly get from the answer?



 $24 \div \frac{1}{4} = 96$ the number of people they can feed

Guide 7

Litho 50112

Total Content Points: 1 (5.NF.7b)

Total Practice Points: 0


The student solves for the correct product of $\frac{1}{4} \times 36$ but fails to provide a context for this solution (no credit for 5.NF.4a). The student solves for the correct quotient of $24 \div \frac{1}{4}$ and appropriately recognizes that it represents the number of people Molly can serve (5.NF.7b). The response fails to identify the contextual meaning of $\frac{1}{4} \times 36$, although the student provides context for $24 \div \frac{1}{4}$ (no credit for MP1). The student does not correctly label the product of $\frac{1}{4} \times 36$ (no credit for MP6). Since no work, appropriate explanations, or diagrams are provided, there is no clear indication that the student recognizes the relationship between division and multiplication or that the student understands multiplication of a whole number by a fraction as the partitioning of a whole number into parts of a given size (no credit for MP7).

Total Awarded Points: 1 out of 5


Task 3. Stew Recipe Task

Molly's recipe for stew says to use $\frac{1}{4}$ pound of potatoes per person. Molly has 24 pounds of potatoes. Molly wonders if she has enough potatoes to make stew for all 36 people who will be at her party.

- a. Calculate $\frac{1}{4} \times 36$. What information can Molly get from the answer?

 The number of potatoes for 36 pounds she will need.

- b. Calculate $24 \div \frac{1}{4}$. What information can Molly get from the answer?

 The number of stews she can make with 24 pounds.

Total Content Points: 0

Total Practice Points: 1 (MP1)


The student recognizes the context of $\frac{1}{4} \times 36$, but does not provide the product (no credit for 5.NF.4a). The student also recognizes the context of $24 \div \frac{1}{4}$, but does not provide the quotient (no credit for 5.NF.7b). By providing the appropriate contexts for each expression the student has shown understanding of each problem (MP1). The student does not provide correct solutions to either expression (no credit for MP6). Since no work, appropriate explanations, or diagrams are provided, there is no indication that the student understands multiplication of a whole number by a fraction as the partitioning of a whole into parts of a given size, or recognizes the relationship between division and multiplication (no credit for MP7).

Total Awarded Points: 1 out of 5


Task 3. Stew Recipe Task

Molly's recipe for stew says to use $\frac{1}{4}$ pound of potatoes per person. Molly has 24 pounds of potatoes. Molly wonders if she has enough potatoes to make stew for all 36 people who will be at her party.

- a. Calculate $\frac{1}{4} \times 36$. What information can Molly get from the answer?

 She can make 9 stews

- b. Calculate $24 \div \frac{1}{4}$. What information can Molly get from the answer?

 She can make 96 stews

Guide 9

Litho 50223

Total Content Points: 1 (5.NF.7b)

Total Practice Points: 0

The student does not accurately determine the product of $\frac{1}{4} \times 36$ and provides an inappropriate context (no credit for 5.NF.4a). The student identifies the correct quotient of $24 \div \frac{1}{4}$ and identifies the appropriate context (“she can make 96 stews”) (5.NF.7b).


The student only identifies the proper context for one of the expressions (no credit for MP1). The student does not recognize that Molly needs 9 pounds of potatoes to feed 36 people (no credit for MP6). Since no work, appropriate explanations, or diagrams are provided, there is no indication that the student understands multiplication of a whole number by a fraction as the partitioning of a whole into parts of a given size, or recognizes the relationship between division and multiplication (no credit for MP7).

Total Awarded Points: 1 out of 5

Task 3: Stew Recipe Task


Molly's recipe for stew says to use $\frac{1}{4}$ pound of potatoes per person. Molly has 24 pounds of potatoes. Molly wonders if she has enough potatoes to make stew for all 36 people who will be at her party.

- a. Calculate $\frac{1}{4} \times 36$. What information can Molly get from the answer?


$$\frac{1}{4} \times 36 = 9$$
$$\frac{4}{1} \times \frac{36}{1} = \frac{144}{1} = 144$$

She has enough

- b. Calculate $24 \div \frac{1}{4}$. What information can Molly get from the answer?


$$24 \div \frac{1}{4} = 96$$

She definitely has enough

Total Content Points: 0

Total Practice Points: 1 (MP7)


The student determines the correct product of $\frac{1}{4} \times 36$ and the correct quotient of $24 \div \frac{1}{4}$. However, the student does not clearly state the context of either solution, instead simply stating “She has enough” (no credit for 5.NF.4a, no credit for 5.NF.7b). The student’s explanation of why Molly has enough potatoes recognizes the relationship between division of a whole number by a fraction and how it relates to a whole number multiplied by the reciprocal of the fraction (MP 7). The student fails to provide a proper context for each expression or correct labels on the responses (no credit for MP 1, no credit for MP 6).

Total Awarded Points: 1 out of 5


Task 3. Stew Recipe Task

Molly's recipe for stew says to use $\frac{1}{4}$ pound of potatoes per person. Molly has 24 pounds of potatoes. Molly wonders if she has enough potatoes to make stew for all 36 people who will be at her party.

- a. Calculate $\frac{1}{4} \times 36$. What information can Molly get from the answer?

 She can add the 9 potatoes from the sentences $27 + 9 = 36$ pounds so yes she will have enough.

- b. Calculate $24 \div \frac{1}{4}$. What information can Molly get from the answer?

 $24 \div \frac{1}{4} = 96$ each person will have 96 pounds of potatoes.

Total Content Points: 0

Total Practice Points: 0


The student determines the correct product of $\frac{1}{4} \times 36$ and the correct quotient of $24 \div \frac{1}{4}$. However, the student does not recognize the appropriate context for either solution (no credit for 5.NF.4a, no credit for 5.NF.7b). Even though the student states that Molly has enough potatoes, the student does not recognize the appropriate context or provide labels for either solution (no credit for MP1, no credit for MP6). Since no appropriate work, appropriate explanations, or diagrams are provided, there is no clear indication that the student understands multiplication of a whole number by a fraction as the partitioning of a whole into parts of a given size, or recognizes the relationship between division and multiplication (no credit for MP7).

Total Awarded Points: 0 out of 5

Task 3. Stew Recipe Task

Molly's recipe for stew says to use $\frac{1}{4}$ pound of potatoes per person. Molly has 24 pounds of potatoes. Molly wonders if she has enough potatoes to make stew for all 36 people who will be at her party.


- a. Calculate $\frac{1}{4} \times 36$. What information can Molly get from the answer?



$\frac{1}{4} \times 36 = 9$

the information that she can get is that she doesn't have enough potatoes. She needs a full pound of potatoes.

- b. Calculate $24 \div \frac{1}{4}$. What information can Molly get from the answer?



$24 \div \frac{1}{4} = 96$

Total Content Points: 0

Total Practice Points: 0

The student determines the correct product of $\frac{1}{4} \times 36$ and the correct quotient of $24 \div \frac{1}{4}$. However, the student does not recognize the appropriate context for either solution (no credit for 5.NF.4a, no credit for 5.NF.7b). The student does not recognize the appropriate context or provide labels for either solution (no credit for MP1, no credit for MP6). Since no work, appropriate explanations, or diagrams are provided, there is no indication that the student understands multiplication of a whole number by a fraction as the partitioning of a whole into parts of a given size, or recognizes the relationship between division and multiplication (no credit for MP7).

Total Awarded Points: 0 out of 5