

Tennessee Comprehensive Assessment Program / Mathematics

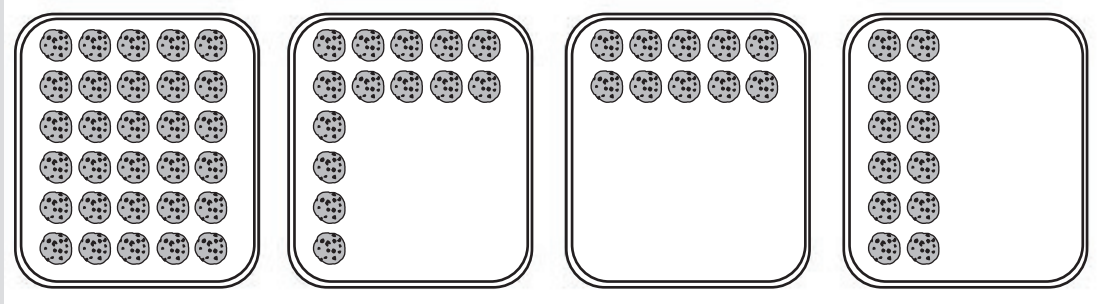
TCAP/CRA PILOT 2012



Task 1 : The Bakery Scoring Guide

Task 1. The Bakery Task

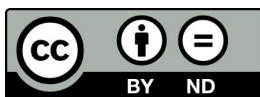
On Monday morning, the baker baked 4 full trays of cookies to sell in his shop.
Each tray had the same number of cookies on it.
Here is what the trays looked like on Monday evening.



- a. How many cookies did the baker sell on Monday? Show how to use multiplication equations and other operations, if needed, to show how you solved the problem. Refer to the trays of cookies in your explanation.

A large empty rectangular box for writing the answer, with a small icon of a hand holding a pencil in the top left corner.

b. Use words or equations to explain how you know your total is correct.



1. The Bakery Task Scoring Guide

The CCSS for Mathematical Content (2 points)

- 3.OA.1 The student provides some indication that one of the factors in a multiplication equation represents groups or rows/columns and the other represents the objects in the group. _____
- 3.OA.3 The student provides multiplication equations or a written explanation that indicate that the student made sense of an array model and is able to relate the model to the multiplication equations. _____

Total Content Points _____

The CCSS for Mathematical Practices (5 points)

- MP1 Explanation or equations indicate that an association has been made between the cookies remaining on the trays and the cookies sold. _____
(MP1: Make sense of problems and persevere in solving them.)
- MP2 The student writes multiplication equations and re-contextualizes the equations by providing labels or referencing the context. _____
(MP2: Reason abstractly and quantitatively.)
- MP3 The student provides a logical explanation as to how the total number of cookies sold was determined. _____
(MP3: Construct viable arguments and critique the reasoning of others.)
- MP4 The student builds arrays or writes expressions/equations to model the missing cookies, or uses expressions/equations to model the remaining cookies in the incomplete arrays. _____
(MP4: Model with mathematics.)
- MP6 The equations are performed correctly. The student finds the correct total number of cookies sold. _____
(MP6: Attend to precision.)

Total Practice Points _____

Total Awarded Points _____

The CCSS for Mathematical Content Addressed in This Task

Represent and solve problems involving multiplication and division.

- 3.OA.1 Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each.
- 3.OA.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

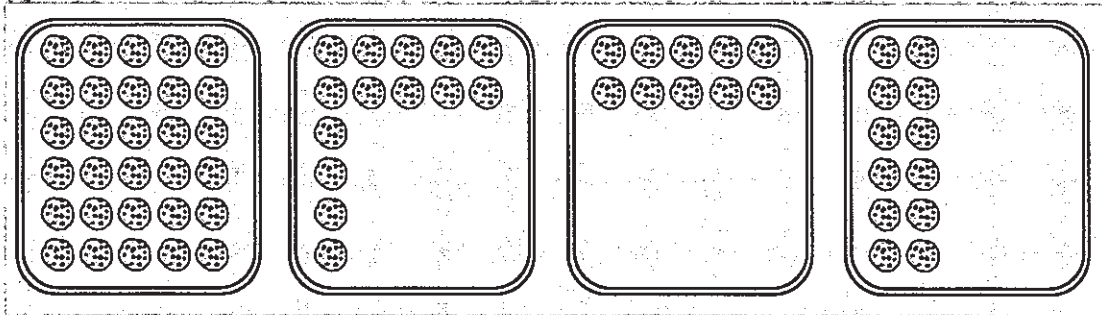
The CCSS for Mathematical Practices*

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.

On Monday morning, the baker baked 4 full trays of cookies to sell in his shop.
 Each tray had the same number of cookies on it.
 Here is what the trays looked like on Monday evening.



- a. How many cookies did the baker sell on Monday? Show how to use multiplication equations and other operations, if needed, to show how you solved the problem. Refer to the trays of cookies in your explanation.


$T_1 = 5 \times 6 = 30$ cookies
 $T_2 = 14$ cookies $30 - 14 = 16$
 $T_3 = 10$ cookies $30 - 20 = 20$
 $T_4 = 12$ cookies $30 - 12 = 18$

	1
30	
16	
20	
18	
54	

54 cookies were sold

b. Use words or equations to explain how you know your total is correct.

Guide 1b

 I figured it out by looking at the first tray and saw there were 30 cookies. Then I looked at the others and got the numbers 14, 10, and 22. Then, I subtracted the numbers 14, 14, and 12 from 30 and got the numbers 16, 18, and 20. Then finally, I got a calculator and added ~~30~~ plus 18 plus 16 and got 54.



Guide 1

Litho 30044

Total Content Points: 2 (3.OA.1, 3.OA.3)

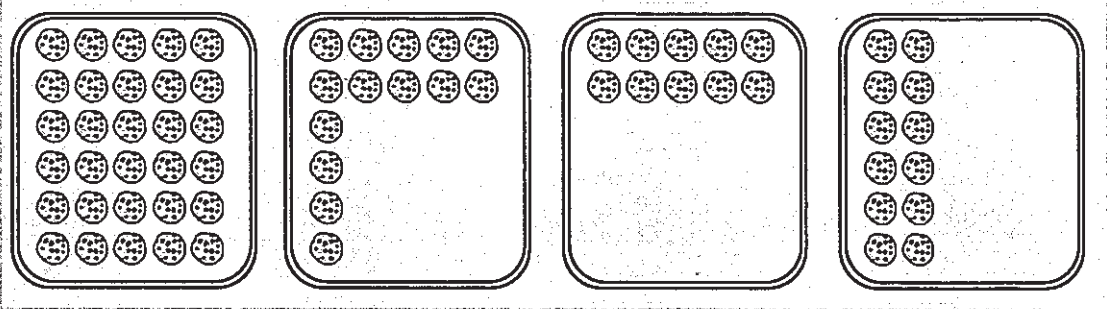
Total Practice Points: 5 (MP1, MP2, MP3, MP4, MP6)

This response uses multiplication to find the number of cookies in a full tray (3.OA.1), and uses the product to find the number of missing cookies (3.OA.3). The product is correctly labeled (MP2), and the student clearly recognizes that the missing cookies represent the cookies sold, and completes the response by finding the correct number of cookies sold (MP1). The student uses equations and an expression to model the cookies missing from each tray and the total number sold (MP4). All of the equations are appropriate and correctly performed (MP6). The explanation is clear, comprehensive, and logical (MP3).


Total Awarded Points: 7 out of 7

Task 1. The Bakery Task

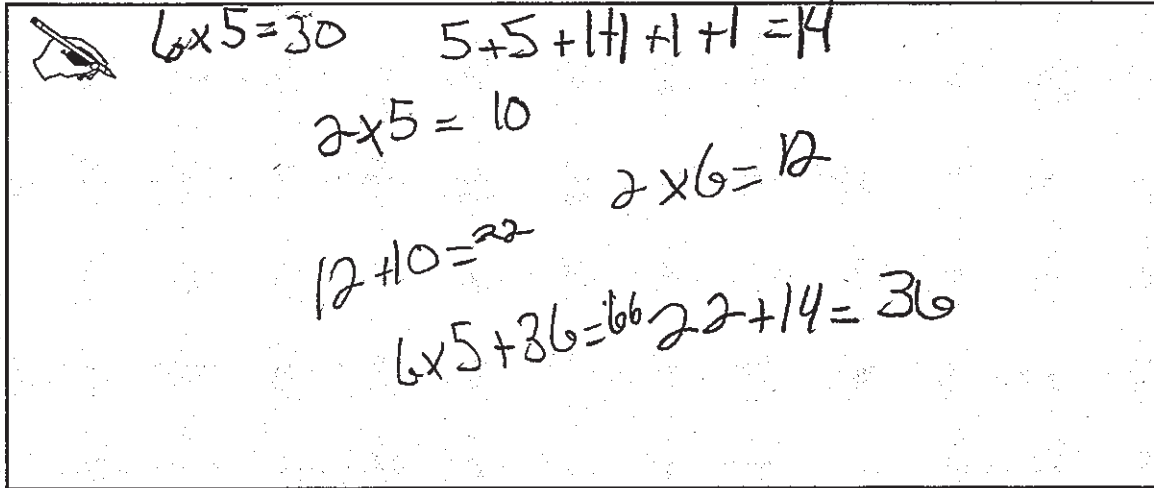
On Monday morning, the baker baked 4 full trays of cookies to sell in his shop.
 Each tray had the same number of cookies on it.
 Here is what the trays looked like on Monday evening.



- a. How many cookies did the baker sell on Monday? Show how to use multiplication equations and other operations, if needed, to show how you solved the problem. Refer to the trays of cookies in your explanation.

 The baker sold 66 cookies because he had 30 on one tray and 14 on another. $(30+14=44)$, The next tray had 10 so I added $10+44=54$, The last tray had 12 cookies so $54+12=66$.

b. Use words or equations to explain how you know your total is correct.



$6 \times 5 = 30$ $5 + 5 + 1 + 1 + 1 = 14$
 $2 \times 5 = 10$
 $2 \times 6 = 12$
 $12 + 10 = 22$
 $6 \times 5 + 36 = 66$ $22 + 14 = 36$



Guide 2

Litho 30264

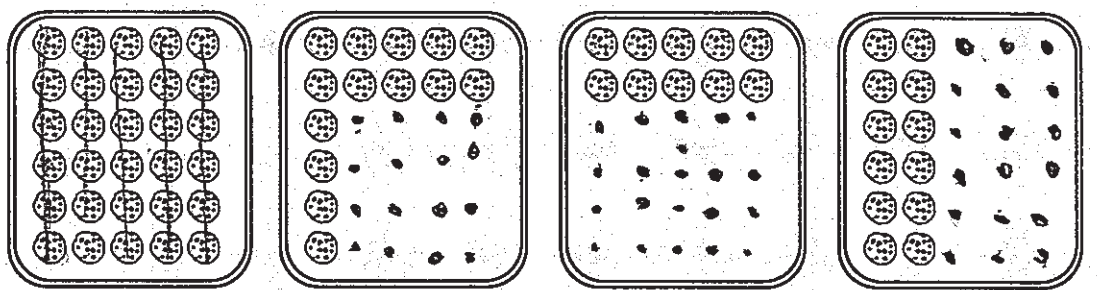
Total Content Points: 2 (3.OA.1, 3.OA.3)

Total Practice Points: 4 (MP1, MP2, MP4, MP6)


This response shows in the equations in part b that the student has an understanding of multiplication of arrays, as he multiplies to find the cookies remaining on the first, third, and fourth trays (3.OA.1). The products are contextualized by reference to the trays in the explanation in part a (MP2), and are used to find the number of missing cookies (3.OA.3). The student is able to model the remaining cookies using equations (MP4) and clearly understands that the cookies missing from the arrays equal the cookies sold (MP1). However, the explanation is lacking the final step of showing that the number remaining is subtracted from the number from the beginning of the day, so the student has not completely and clearly explained his process for finding the total number sold (no credit for MP3). Although the explanation is incomplete, the work shown is correct and accurate (MP6).

Total Awarded Points: 6 out of 7

On Monday morning, the baker baked 4 full trays of cookies to sell in his shop.
 Each tray had the same number of cookies on it.
 Here is what the trays looked like on Monday evening.




- a. How many cookies did the baker sell on Monday? Show how to use multiplication equations and other operations, if needed, to show how you solved the problem. Refer to the trays of cookies in your explanation.

 He had twentynine
 on each tray $29 \times 4 = 116$
 the second tray has 16 missing
 The third tray has 20 missing

The fourth tray has 18 missing

$$\begin{array}{r}
 20 \\
 10 + 18 \\
 \hline
 38 \\
 + 16 \\
 \hline
 54
 \end{array}$$

b. Use words or equations to explain how you know your total is correct.



54. Because I
use this strategy a lot



Guide 3

Litho 30229

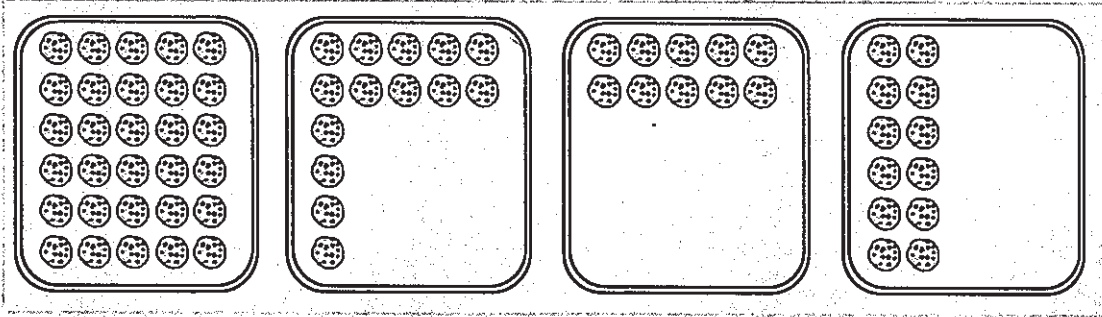
Total Content Points: 1 (3.OA.1)

Total Practice Points: 4 (MP1, MP2, MP3, MP4)


This student has multiplied the number of cookies on one tray by the number of trays to find the original number of cookies (3.OA.1). However, the student does not use multiplication to find the number of cookies sold, as she appears to count the number missing from each tray and add those totals to get the result (no credit for 3.OA.3). Although the student has not used the multiplication equation to solve the problem, the multiplication equation is correctly contextualized and could be used as a part of an appropriate method of answering the question (MP2). The incorrect counting of the number of cookies on the first tray demonstrates a lack of precision (no credit for MP6), but the student does successfully model the missing cookies by completing the incomplete arrays (MP4). The method of solving the problem used in the response shows a clear understanding that the number of cookies missing from the incomplete arrays equals the number of cookies sold, and the student demonstrates a logical and effective process for finding the correct number of cookies sold (MP1, MP3).

Total Awarded Points: 5 out of 7

On Monday morning, the baker baked 4 full trays of cookies to sell in his shop.
 Each tray had the same number of cookies on it.
 Here is what the trays looked like on Monday evening.



- a. How many cookies did the baker sell on Monday? Show how to use multiplication equations and other operations, if needed, to show how you solved the problem. Refer to the trays of cookies in your explanation.

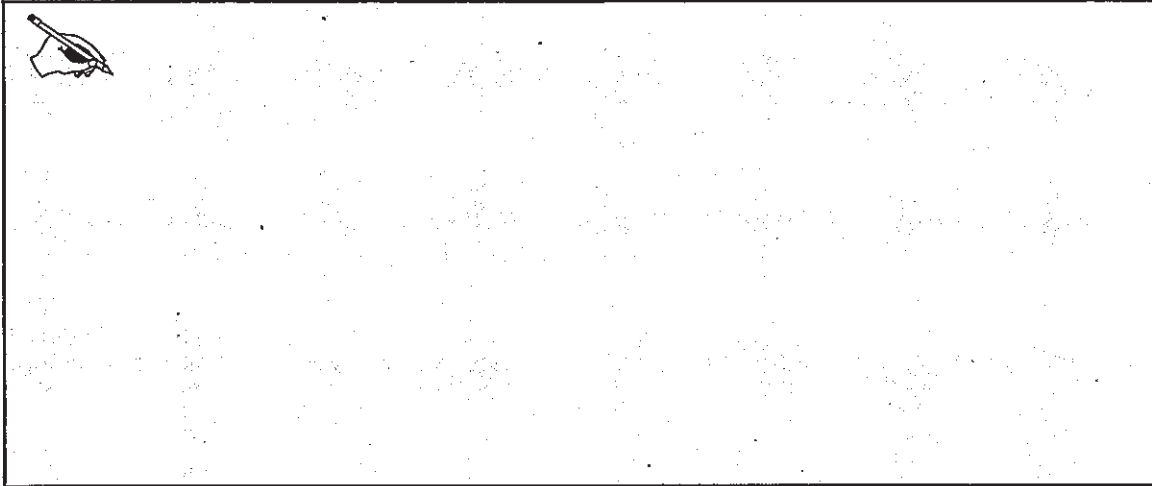


$$\begin{array}{r}
 6 \times 9 = 54 \\
 6 \times 5 = 30 \\
 \hline
 54
 \end{array}$$

He sold 54 cookies. On each tray there was 30. But on the 2nd tray there was 14. That means 16 was sold on the 2nd tray. On the the 3rd tray, there was 10 that means 20 was sold on the 3rd tray. On the 4th tray there

was 12 left. That means 18 was sold. $16 + 20 = 36$, $36 + 18 = 54$

b. Use words or equations to explain how you know your total is correct.



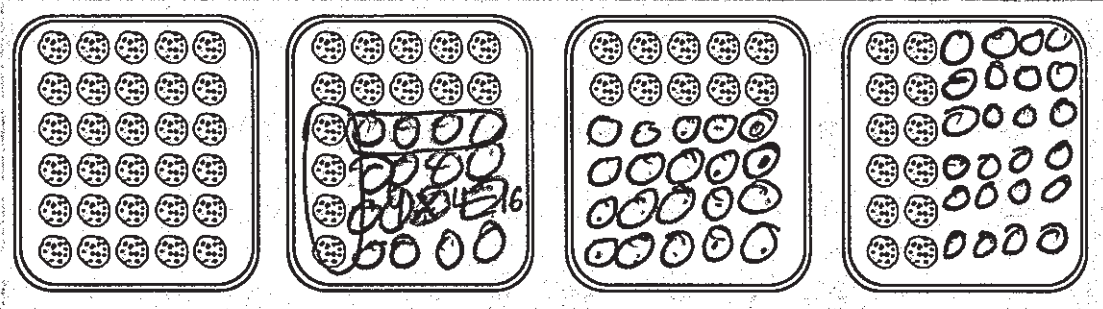
Total Content Points: 0

Total Practice Points: 4 (MP1, MP3, MP 4, MP6)


Although this student finds the correct number of cookies sold, he does not show any evidence of understanding how to use multiplication to find the number of objects in an array (no credit for 3.OA.1). The student uses counting, subtraction, and addition to find the number of missing cookies rather than multiplication (no credit for 3.OA.3). The student does demonstrate a clear awareness that the number of cookies missing is equal to the number sold, and explains a logical and complete process for arriving at the correct answer (MP1, MP3). The expressions and equations in the explanation are correct (MP6) and properly labeled, and the student does model the missing cookies (MP4). The student has not demonstrated the ability to use multiplication in a correct context because he has not used multiplication in addressing the task (no credit for MP2).

Total Awarded Points: 4 out of 7

On Monday morning, the baker baked 4 full trays of cookies to sell in his shop.
 Each tray had the same number of cookies on it.
 Here is what the trays looked like on Monday evening.




- a. How many cookies did the baker sell on Monday? Show how to use multiplication equations and other operations, if needed, to show how you solved the problem. Refer to the trays of cookies in your explanation.

 the baker sold 60 cookies because I looked at the first tray it was full so I looked at the second tray it was not full so I counted how many were on the side & on the top there was six on the side & five on the top now cookies were missing on the third

I counted that row and the ones under it there was four then I counted the cookies missing in the row there were four and $4 \times 4 = 16$ then I did the same to the others and added the answers it added up to 60

b. Use words or equations to explain how you know your total is correct.

 because I filled in the cookies
and counted them.



Guide 5

Litho 30236

Total Content Points: 1 (3.OA.1)

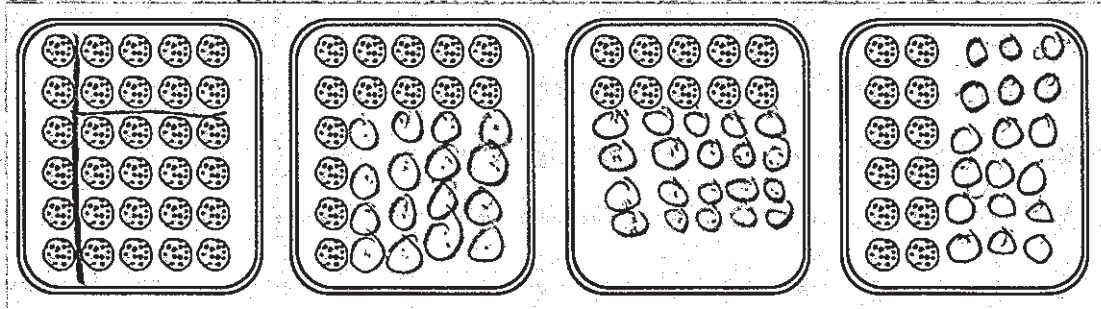
Total Practice Points: 3 (MP1, MP2, MP4)

This student explains her ability to use multiplication to compute the total number of objects in an array by showing how she found the cookies missing from the second tray (3.OA.1). However, there is not enough clear evidence in the explanation that the student can use multiplication as a step in finding the correct number of cookies sold, as the answer given is incorrect, and the explanation of the process used lacks clarity (no credit for 3.OA.3). The student's correct equation and completion of the incomplete arrays shows her ability to model using mathematics (MP4). The student correctly contextualizes the columns and rows on the first incomplete tray (MP2). The student understands that the number of cookies missing from the trays is equal to the number of cookies sold, and she demonstrates an understanding of an overall process to find the number of missing cookies and complete the problem (MP1), even though the explanation of that process is incomplete (no credit for MP3). The unclear explanation, coupled with the incorrect answer, shows a lack of precision in the response (no credit for MP6).

Total Awarded Points: 4 out of 7


Task 1. The Bakery Task

On Monday morning, the baker baked 4 full trays of cookies to sell in his shop.
 Each tray had the same number of cookies on it.
 Here is what the trays looked like on Monday evening.



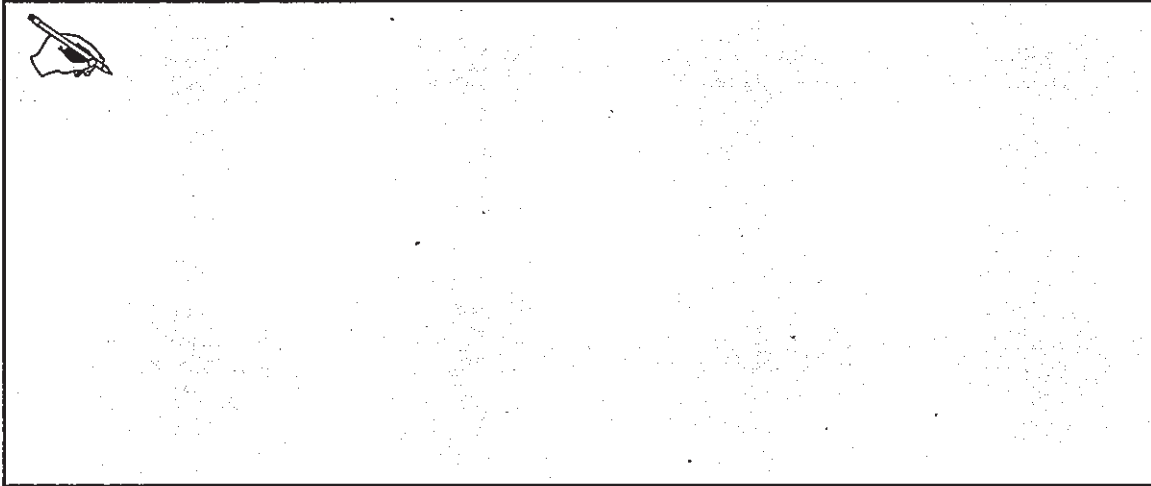
54

- a. How many cookies did the baker sell on Monday? Show how to use multiplication equations and other operations, if needed, to show how you solved the problem. Refer to the trays of cookies in your explanation.

 The baker sold 54 cookies.
 One equation I did was I counted how
 much cookies were in the first box,
 so then I added 16 to the second one,
 and then I added to the other to make 54.

b. Use words or equations to explain how you know your total is correct.

Guide 6b



Page 7

GO ON TO THE NEXT PAGE.



Litho#: 30014

30014

Page 21



Total Content Points: 0

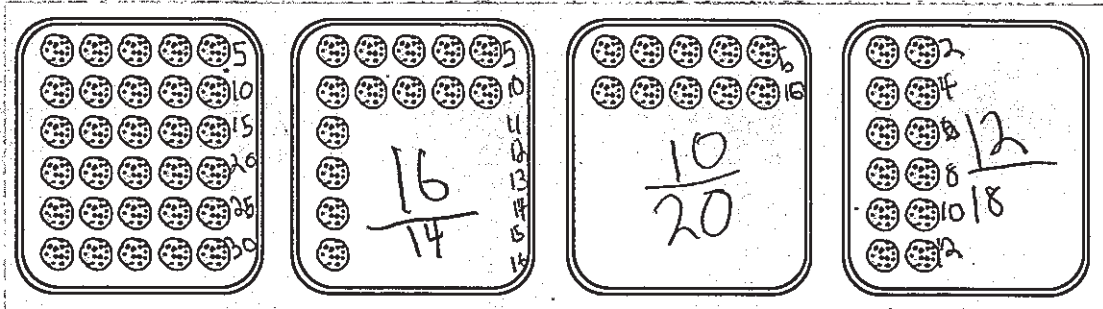
Total Practice Points: 3 (MP1, MP3, MP4)

This student does not show that he understands how to use multiplication to find the number of objects in an array or in four groups of thirty (no credit for 3.OA.1). The student finds the correct number of cookies sold, but does not use multiplication to do so (no credit for 3.OA.1). The student recognizes that the number of cookies missing from the incomplete trays equals the number sold and finds the correct answer to the problem (MP1). The student does not use multiplication to respond to the task, so he does not show any evidence that he can use multiplication in context (no credit for MP2).

Although the explanation provided lacks precision because the student does not clearly explain how many cookies were missing from the third and fourth trays (no credit for MP6), it does outline a logical process for finding the number of missing cookies (MP3). The student has modeled the missing cookies by filling in the figures missing from the incomplete arrays (MP4).

Total Awarded Points: 3 out of 7

On Monday morning, the baker baked 4 full trays of cookies to sell in his shop.
 Each tray had the same number of cookies on it.
 Here is what the trays looked like on Monday evening.



$$\begin{array}{r} 14 \\ + 20 \\ \hline 34 \end{array}$$

$$\begin{array}{r} 34 \\ + 18 \\ \hline 52 \end{array}$$

- a. How many cookies did the baker sell on Monday? Show how to use multiplication equations and other operations, if needed, to show how you solved the problem. Refer to the trays of cookies in your explanation.

First I counted how many cookies there were on the first tray 30 and then I counted to see how many cookies were on the other trays: 16, 10, 12

$\begin{array}{r} 14 \\ + 20 \\ \hline 34 \end{array}$	$\begin{array}{r} 34 \\ + 18 \\ \hline 52 \end{array}$	<p>52 is the answer.</p>
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and then I counted to see how many cookies were missing: 14, 20, 18.

b. Use words or equations to explain how you know your total is correct.

<p>16 Should be 30 missing 14</p> $\begin{array}{r} 16 \\ + 20 \\ \hline 34 \end{array}$ <p>10 Should be 30 missing 20</p>	<p>2nd 2 Should be 30 missing 19</p> $\begin{array}{r} 18 \\ + 24 \\ \hline 52 \end{array}$	<p>3. 52 is the answer:</p>	<p>4.</p>
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Total Content Points: 0

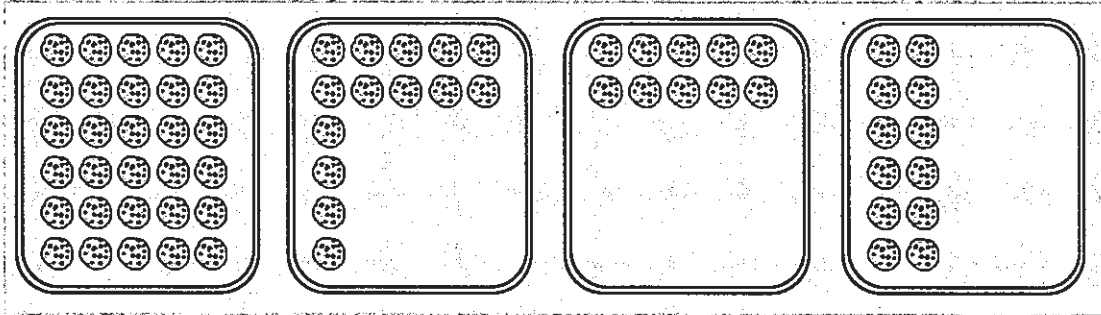
Total Practice Points: 2 (MP1, MP3)

This student does not use multiplication and therefore she does not show any understanding of how to use multiplication to find the total number of objects in an array or in four groups of thirty objects each (no credit for 3.OA.1). The student also fails to use multiplication as part of a strategy to find the number of cookies sold (no credit for 3.OA.3). The attempt to find the number of cookies missing from the trays by counting the remaining cookies and subtracting that number from the full array shows an awareness that the cookies missing from the arrays have been sold, and that the student understands a logical and correct strategy to find the missing cookies (MP1). The student does not demonstrate an understanding of how to use multiplication in context (no credit for MP2), but the given explanation presents a logical and effective strategy for solving the problem (MP3). The inconsistent and incorrect method the student uses to show the number of cookies missing from each tray demonstrates unsuccessful modeling (no credit for MP4), and a lack of precision in the student's work (no credit for MP6).


Total Awarded Points: 2 out of 7

Task 1. The Bakery Task


On Monday morning, the baker baked 4 full trays of cookies to sell in his shop.
 Each tray had the same number of cookies on it.
 Here is what the trays looked like on Monday evening.



- a. How many cookies did the baker sell on Monday? Show how to use multiplication equations and other operations, if needed, to show how you solved the problem. Refer to the trays of cookies in your explanation.

 The baker sold 120 cookies that day because thirty cookies are in each tray and 4 trays would equal 120 cookies.

- b. Use words or equations to explain how you know your total is correct.



30 cookies x 4 trays = 120 cookies
in all.



Guide 8

Litho 30392

Total Content Points: 1 (3.OA.1)

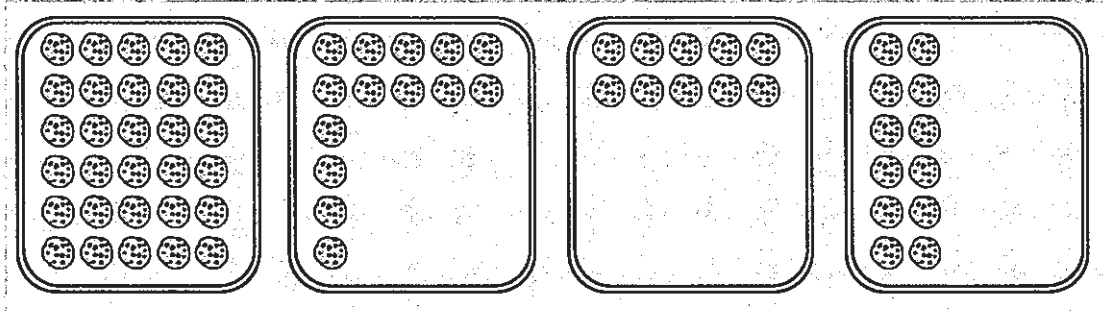
Total Practice Points: 1 (MP2)

This student shows the ability to find the number of cookies on four complete trays using multiplication (3.OA.1). The student does not use multiplication as a step in an appropriate solution to the problem (no credit for 3.OA.3), and thus has not correctly understood the task (no credit for MP1). This multiplication equation is correctly labeled and contextualized (MP2). There is no clear explanation for why the total number of cookies baked would equal the number sold (no credit for MP3). The student has made no attempt to model either the missing or the remaining cookies (no credit for MP4). The student has not found the correct number of cookies sold or explained an appropriate method with any precision (no credit for MP6).

Total Awarded Points: 2 out of 7

Task 1. The Bakery Task

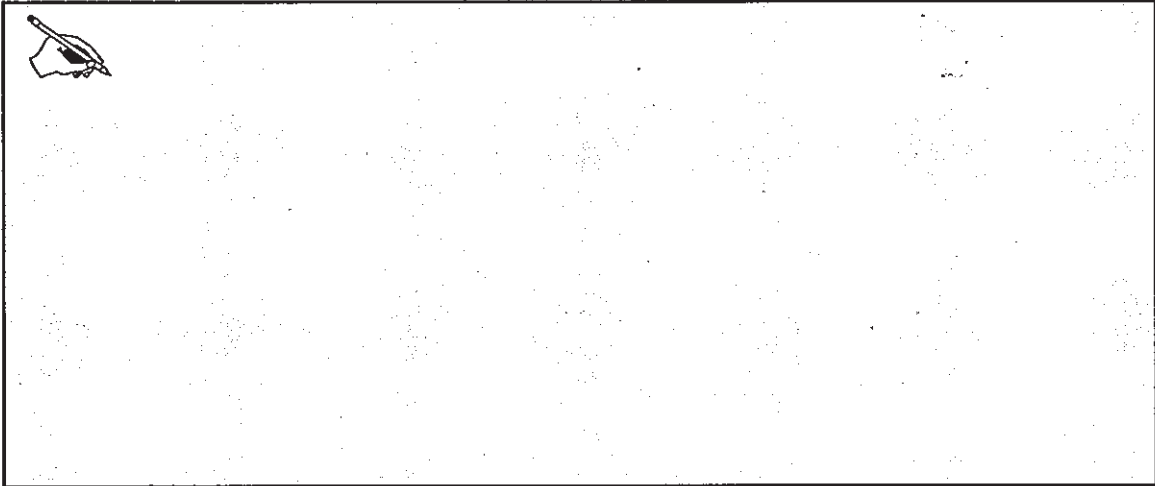
On Monday morning, the baker baked 4 full trays of cookies to sell in his shop.
 Each tray had the same number of cookies on it.
 Here is what the trays looked like on Monday evening.



- a. How many cookies did the baker sell on Monday? Show how to use multiplication equations and other operations, if needed, to show how you solved the problem. Refer to the trays of cookies in your explanation.

$30 \times 4 = 120$
 $30 + 30 + 30 + 30 = 120$

b. Use words or equations to explain how you know your total is correct.



Guide 9

Litho 30261

Total Content Points: 1 (3.OA.1)

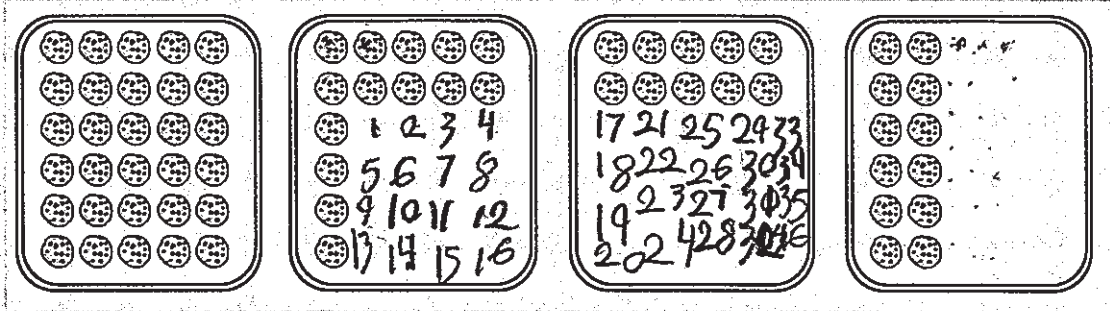
Total Practice Points: 0

This response indicates that the student has recognized the process for determining the total number of objects in four groups of thirty objects each (3.OA.1). The student has not used multiplication to find the correct number of cookies sold (no credit for 3.OA.3). The student does not demonstrate an understanding of the task (no credit for MP1). Because there is no labeling of the numbers shown, the student has not successfully placed the equations into context (no credit for MP2), and there is no explanation creating a viable argument that the baker has sold any amount of cookies (no credit for MP3). The student has made no attempt to model either the missing or the remaining cookies (no credit for MP4). The student has not found the correct number of cookies sold or explained an appropriate method with any precision (no credit for MP6).

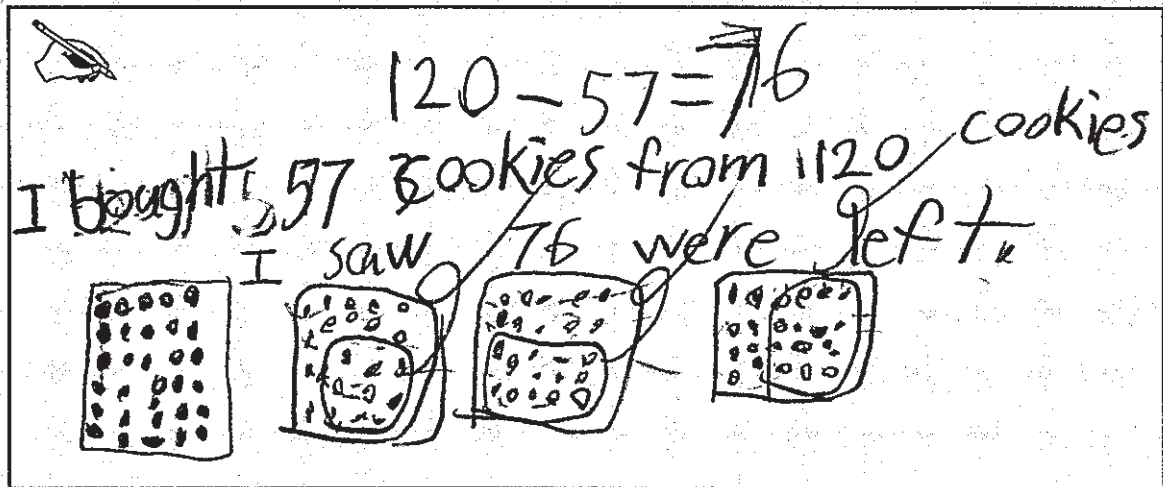
Total Awarded Points: 1 out of 7

Task 1. The Bakery Task


On Monday morning, the baker baked 4 full trays of cookies to sell in his shop.
 Each tray had the same number of cookies on it.
 Here is what the trays looked like on Monday evening.



- a. How many cookies did the baker sell on Monday? Show how to use multiplication equations and other operations, if needed, to show how you solved the problem. Refer to the trays of cookies in your explanation.



b. Use words or equations to explain how you know your total is correct.

 I counted the ones missing and that were there.



Total Content Points: 0

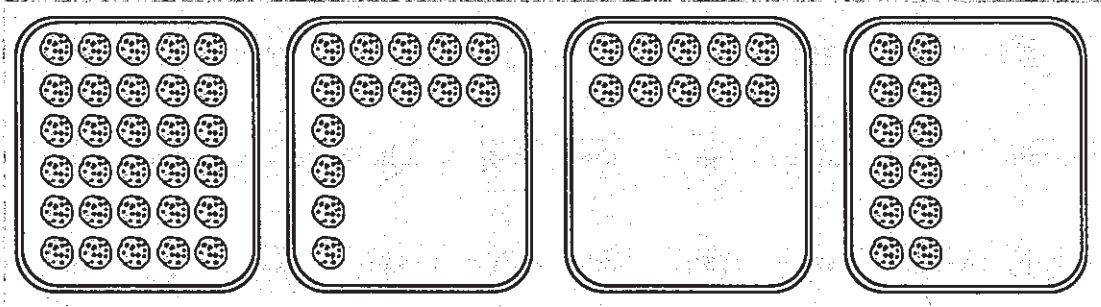
Total Practice Points: 1 (MP1)

This student has not demonstrated the ability to use multiplication to find the total number of objects in an array or in four groups of thirty objects each (no credit for 3.OA.1). This response does not use multiplication to find the number of cookies sold, remaining, or originally baked (no credit for 3.OA.3). The response appears to show that the number of cookies remaining needs to be subtracted from the original set to find the number sold, and the student appears to be using a correct method to find the number of missing cookies (MP1). The attempt at labeling the numbers used in the calculations is unclear, and the student has not successfully contextualized multiplication equations (no credit for MP2). The response lacks clear and precise explanation (no credit for MP3). Although the student has tried to model the cookies missing from the incomplete arrays, the modeling is incorrect and incomplete (no credit for MP4). The calculation included is performed incorrectly, and the result is an incorrect number given for the number of cookies sold (no credit for MP6).


Total Awarded Points: 1 out of 7

Task 1. The Bakery Task


On Monday morning, the baker baked 4 full trays of cookies to sell in his shop.
 Each tray had the same number of cookies on it.
 Here is what the trays looked like on Monday evening.



- a. How many cookies did the baker sell on Monday? Show how to use multiplication equations and other operations, if needed, to show how you solved the problem. Refer to the trays of cookies in your explanation.

 ~~How~~ I solved it is I counted up all the cookies and saw it was 66. So I multiplied it by 2 (66 x 2) and got 132.

b. Use words or equations to explain how you know your total is correct.

 I know my total is correct because $66 \times 2 = 132$, and because I checked it on my calculator.



Total Content Points: 0

Total Practice Points: 0

This response includes an accurate multiplication equation, but the explanation given does not clarify why the student has multiplied (no credit for 3.OA.1). There is no evidence that the student understands how to use multiplication to solve the problem (no credit for 3.OA.3) The approach taken to find the answer is not a valid one, and the student appears to misunderstand the task (no credit for MP1). Although the student has correctly multiplied, the equation has no context (no credit for MP2). There is no evidence of a correct approach to the problem, and the explanation given is incorrect (no credit for MP3). The situation is not modeled, although the student appears to have counted the remaining cookies (no credit for MP4). The answer given is incorrect, and the explanation lacks clarity and precision (no credit for MP6).

Total Awarded Points: 0 out of 7