

Tennessee Comprehensive Assessment Program / Mathematics

TCAP/CRA PILOT 2012



Task 4 : How Many More Scoring Guide

Task 4. How Many More? Task

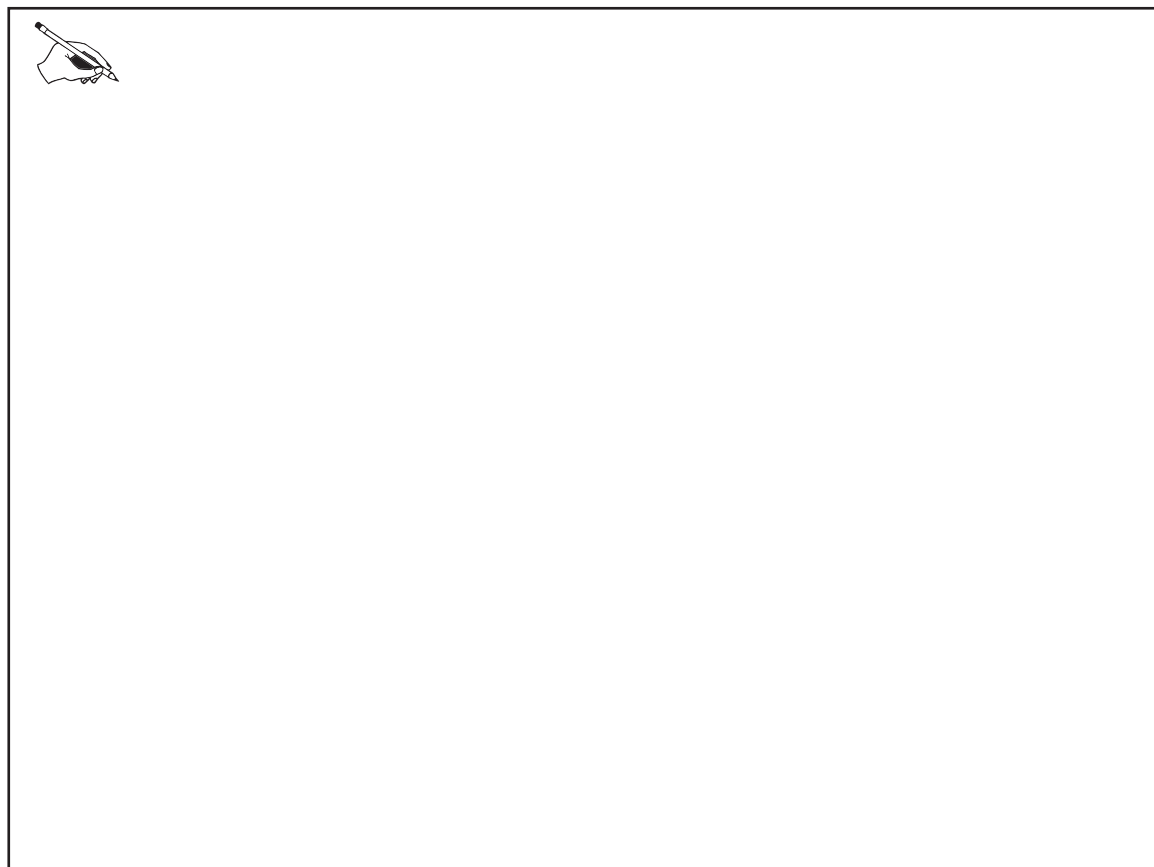
Sam has 3 boxes of donuts. He has 9 donuts in each box.

Anne has 5 boxes of donuts. She has 9 donuts in each box.

Anne has more donuts than Sam does.

She claims that she can figure out her amount of donuts by using what she knows about Sam's 3 boxes of donuts with 9 donuts in each box.

Draw a picture and write a multiplication equation to show how Anne can use Sam's situation to find the number of donuts that she has in 5 boxes.



REVIEW YOUR
WORK IF YOU
HAVE TIME.

4. How Many More Task Scoring Guide

The CCSS for Mathematical Content (2 points)

3.OA.1 Drawings and/or equations indicate an understanding of equal groups with 9 objects. _____

3.OA.5 Drawings and/or equations indicate that the product for Sam's boxes of donuts is used to determine the product for Anne's boxes of donuts. _____

Total Content Points _____

The CCSS for Mathematical Practices (4 points)

MP2 Writes equations and re-contextualizes the equations within the context of the word problem. _____
(MP2: Reason abstractly and quantitatively.)

MP4 Provides a diagram or an equation indicating how known facts can be used to find unknown products. _____
(MP4: Model with mathematics.)

MP6 Drawing and equations for related multiplication equations are accurate and performed correctly. _____
(MP6: Attend to precision.)

MP7 Work shows an understanding that 2×9 and 3×9 can be composed to form 5×9 . _____
(MP7: Look for and make use of structure.)

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.

Understand properties of multiplication and the relationship between multiplication and division.

3.OA.5 Apply properties of operations as strategies to multiply and divide. *Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative property of multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$. (Associative property of multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive property.)*

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 assessment.

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 4. How Many More? Task


Sam has 3 boxes of donuts. He has 9 donuts in each box.

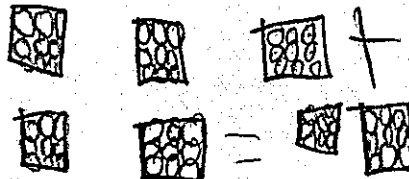
Anne has 5 boxes of donuts. She has 9 donuts in each box.

Anne has more donuts than Sam does.

She claims that she can figure out her amount of donuts by using what she knows about Sam's 3 boxes of donuts with 9 donuts in each box.

Draw a picture and write an equation to show how Anne can use Sam's situation to find the number of donuts that she has in 5 boxes.

 You multiply $3 \times 9 = 27$,
 then you multiply $2 \times 9 = 18$
 then you add $27 + 18 = 45$
 Anne has 45 donuts


 $5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 45$
 or
 $9 + 9 + 9 + 9 + 9$



Guide 1

Litho 30115

Total Content Points: 2 (3.OA.1, 3.OA.5)

Total Practice Points: 4 (MP2, MP4, MP6, MP7)

The student provides correct equations and diagrams displaying equal groups with nine objects each (3.OA.1) and uses Sam's situation to determine Anne's total donuts (3.OA.5). The equations contextualize the relationship between Sam's and Anne's totals (MP2), and both the diagram and the equations indicate how a known fact (Sam's product) is used to find an unknown result (in this case, Anne's total) (MP4). Equations as well as diagrams are complete and accurate (MP6), and the work shows how 2×9 and 3×9 can be combined to determine 5×9 (MP7).

Total Awarded Points: 6 out of 6

Task 4. How Many More? Task

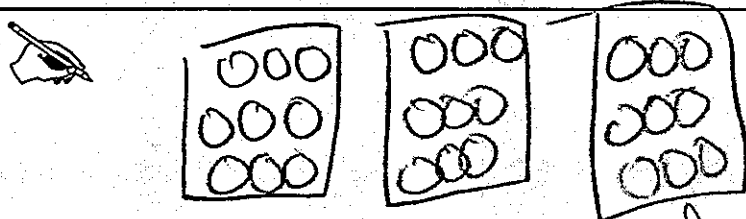
Sam has 3 boxes of donuts. He has 9 donuts in each box.

Anne has 5 boxes of donuts. She has 9 donuts in each box.

Anne has more donuts than Sam does.

She claims that she can figure out her amount of donuts by using what she knows about Sam's 3 boxes of donuts with 9 donuts in each box.

Draw a picture and write an equation to show how Anne can use Sam's situation to find the number of donuts that she has in 5 boxes.



Anne can use Sam's donut boxes to find her amount by doing $9 \times 3 = 36$. She could add 18 to 36 to get 45, because $2 \times 9 = 18$ and $3 \times 9 = 36$ and $3 + 2 = 5$.



Guide 2

Litho 30016

Total Content Points: 2 (3.OA.1, 3.OA.5)

Total Practice Points: 3 (MP2, MP4, MP7)

The student provides a diagram with equal groups of 9 and corresponding equations (3.OA.1), and uses the product of Sam's boxes to determine Anne's total (3.OA.5). The equations contextualize the task, linking Sam's situation to Anne's (MP2) and indicating how known results can be used to find unknown totals (MP4). The equations also show that the student understands that 2×9 and 3×9 can be employed to determine 5×9 (MP7); however, a calculation error ($9 \times 3 = 36$) displays a lack of attention to precision (no credit for MP6).

Total Awarded Points: 5 out of 6

Task 4. How Many More? Task


Sam has 3 boxes of donuts. He has 9 donuts in each box.

Anne has 5 boxes of donuts. She has 9 donuts in each box.

Anne has more donuts than Sam does.

She claims that she can figure out her amount of donuts by using what she knows about Sam's 3 boxes of donuts with 9 donuts in each box.

Draw a picture and write an equation to show how Anne can use Sam's situation to find the number of donuts that she has in 5 boxes.

 Sam has 3 boxes of donuts with nine donuts in each box.

Anne has 5 boxes of donuts with 9 in each box.

Handwritten work showing Sam's 3 boxes of 9 donuts each, totaling 27, and Anne's 5 boxes of 9 donuts each, totaling 45. A vertical addition shows 27 plus 18 equals 45.

Sam's donuts: $(9) (9) (9)$
27 same

Anne's donuts: $(9) (9) (9) (9) (9)$
45

Equation:
$$\begin{array}{r} 27 \\ + 18 \\ \hline 45 \end{array}$$



Guide 3

Litho 30011

Total Content Points: 2 (3.OA.1, 3.OA.5)

Total Practice Points: 2 (MP4, MP7)

This response shows diagrams displaying understanding of arrays of equal groups of 9 (3.OA.1) and indicates that Sam's situation can be used to calculate Anne's number of donuts (3.OA.5). The student also shows how known facts can be used to find unknown totals (MP4). The diagram and calculations provide evidence that the student knows how to compose 2×9 and 3×9 to arrive at 5×9 (MP7). However, the student does not provide any equations (no credit for MP2, no credit for MP6).

Total Awarded Points: 4 out of 6


Task 4. How Many More? Task

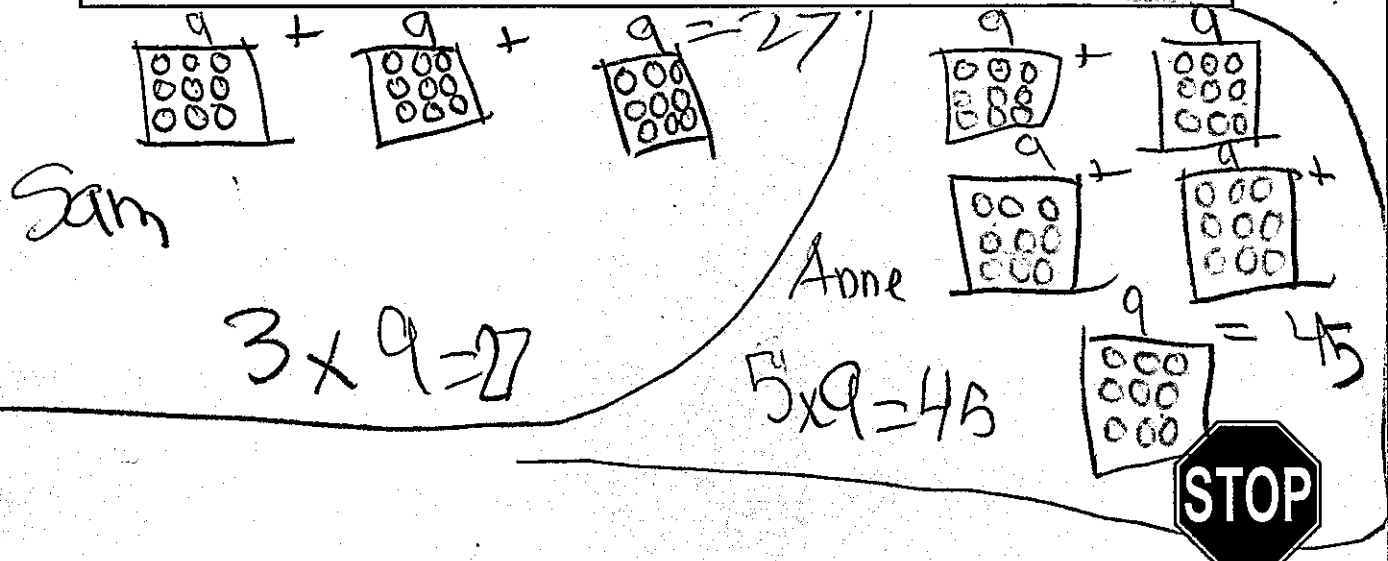
Sam has 3 boxes of donuts. He has 9 donuts in each box.
 Anne has 5 boxes of donuts. She has 9 donuts in each box.

Anne has more donuts than Sam does.

She claims that she can figure out her amount of donuts by using what she knows about Sam's 3 boxes of donuts with 9 donuts in each box.

Draw a picture and write an equation to show how Anne can use Sam's situation to find the number of donuts that she has in 5 boxes.

 Sam has 3 boxes of 9 donuts you would multiply $9 \times 3 = 27$, Sam has 27 donuts.
 Anne has 5 boxes of 9 donuts you multiply $5 \times 9 = 45$, Anne has 45 donuts. Anne has more donuts than Sam, 45 is larger than 27.



STOP
 REVIEW YOUR WORK IF YOU HAVE TIME.

Guide 4

Litho 30034

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

Total Practice Points: 2 (MP2, MP6)

Although there are diagrams and equations that indicate an understanding of equal groups with 9 objects each (3.OA.1), the student does not use the product for Sam's boxes to determine the number of donuts Anne has (no credit for 3.OA.5). On the other hand, the equations and diagrams do reflect the context provided in the task (MP2), and the student's drawings and equations are accurate (MP6). The student does not show how to obtain an unknown total from a known fact (no credit for MP4), nor how 2×9 and 3×9 can be used to calculate 5×9 (no credit for MP7). The student only attempts to demonstrate an already given statement (Anne has more donuts than Sam).

Total Awarded Points: 3 out of 6

Task 4. How Many More? Task

Sam has 3 boxes of donuts. He has 9 donuts in each box.
Anne has 5 boxes of donuts. She has 9 donuts in each box.

Anne has more donuts than Sam does.

She claims that she can figure out her amount of donuts by using what she knows about Sam's 3 boxes of donuts with 9 donuts in each box.

Draw a picture and write an equation to show how Anne can use Sam's situation to find the number of donuts that she has in 5 boxes.

The student's work is contained within a rectangular box. On the left, there is a drawing of a hand holding a pencil. To the right of the pencil is a multiplication problem:
$$\begin{array}{r} 9 \\ \times 5 \\ \hline 45 \end{array}$$
 In the center, there is a diagram of five boxes. The first three boxes are grouped together with a bracket underneath, labeled '18'. The last two boxes are grouped together with a bracket underneath, labeled '18'. A larger bracket underneath all five boxes is labeled '36'. To the right of the boxes, there is a vertical number line starting at 0 and going up to 45. Tick marks are at 9, 18, 27, 36, and 45. The number 9 is written next to the first tick mark, and '9 = 45' is written at the top of the line. An arrow points upwards from the 36 mark to the 45 mark.



REVIEW YOUR WORK IF YOU HAVE TIME.

Guide 5

Litho 30068

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

Total Practice Points: 2 (MP4, MP6)

The drawings and equation in this response show an understanding of how to array groups of 9 objects each (3.OA.1), but the product for Sam's boxes is not used to determine Anne's total (no credit for 3.OA.5). Although the only equation shows addition, the sum is repeated as the result of 5×9 . The two calculations do not reflect what the task asks the student to prove (no credit for MP2), and do not provide evidence of an understanding of how 2×9 and 3×9 can be composed to determine 5×9 (no credit for MP7). On the other hand, the presence of subtotals in the addition equation is an indication of understanding how known facts can be used to find unknown products (MP4). The student's drawing and equations are accurate and performed correctly (MP6).

Total Awarded Points: 3 out of 6

Task 4. How Many More? Task

Sam has 3 boxes of donuts. He has 9 donuts in each box.

Anne has 5 boxes of donuts. She has 9 donuts in each box.

Anne has more donuts than Sam does.

She claims that she can figure out her amount of donuts by using what she knows about Sam's 3 boxes of donuts with 9 donuts in each box.

Draw a picture and write an equation to show how Anne can use Sam's situation to find the number of donuts that she has in 5 boxes.

The diagram shows a hand-drawn illustration of three boxes of donuts. Each box contains 9 donuts, arranged in a 3x3 grid. To the right of the boxes is a hand-drawn equation: $3 \times 9 = 45$. The word "is" is written to the left of the equation. A small drawing of a hand holding a pencil is in the top left corner of the diagram area.



Guide 6

Litho 30022

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

Total Practice Points: 1 (MP6)

The drawing and equation in this response show an understanding of equal groups with 9 objects each (3.OA.1), but no attention is paid to Sam's product (no credit for 3.OA.5). Likewise, the response does not contextualize equations within the context of the task (no credit for MP2) nor does it show how known facts can be used to determine unknown totals (no credit for MP4). The response does not indicate how 2×9 and 3×9 can be used to calculate 5×9 (no credit for MP7). Nevertheless, the drawing and equation are accurate, reflecting attention to precision (MP6).

Total Awarded Points: 2 out of 6

Task 4. How Many More? Task

Sam has 3 boxes of donuts. He has 9 donuts in each box.

Anne has 5 boxes of donuts. She has 9 donuts in each box.

Anne has more donuts than Sam does.

She claims that she can figure out her amount of donuts by using what she knows about Sam's 3 boxes of donuts with 9 donuts in each box.

Draw a picture and write an equation to show how Anne can use Sam's situation to find the number of donuts that she has in 5 boxes.

She can figure it out by counting sam's donuts then adding to more boxes
= 45 donuts



Guide 7

Litho 30199

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

Total Practice Points: 1 (MP4)

The student's drawing displays sufficient understanding of equal groups with 9 objects (3.OA.1), and the student has modeled the total number of donuts, but no attention is paid to Sam's product (no credit for 3.OA.5). Similarly, the response does not contextualize equations within the context of the word problem (no credit for MP2), nor does it show how 2×9 and 3×9 can be used to calculate 5×9 (no credit for MP7). The student only provides a diagram, and no equation (no credit for MP6). Despite not being in a multiplication context and not directly dealing with Sam's total, however, the diagram shows some evidence of how to use known facts to find unknown totals (MP4).

Total Awarded Points: 2 out of 6

Task 4. How Many More? Task


Sam has 3 boxes of donuts. He has 9 donuts in each box.

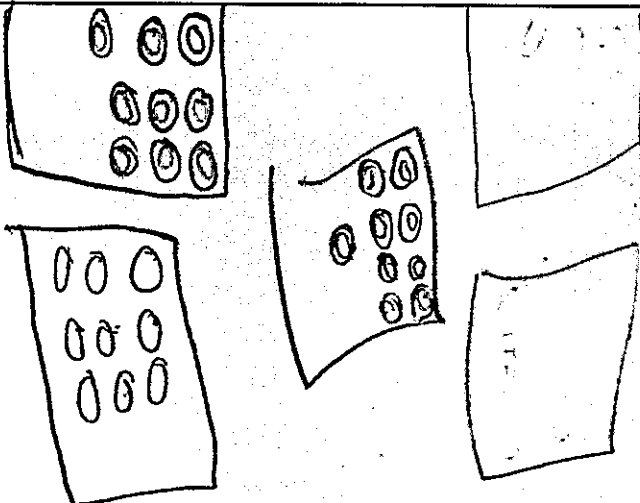
Anne has 5 boxes of donuts. She has 9 donuts in each box.

Anne has more donuts than Sam does.

She claims that she can figure out her amount of donuts by using what she knows about Sam's 3 boxes of donuts with 9 donuts in each box.

Draw a picture and write an equation to show how Anne can use Sam's situation to find the number of donuts that she has in 5 boxes.

 27 because it says that there are 9 in each box and there are 3 boxes and $3 \times 9 = 27$, and $9 + 9 = 18$



Guide 8

Litho 30066

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

Total Practice Points: 0

The drawing displays understanding of equal groups with 9 objects each (3.OA.1), but Sam's number is not used to calculate Anne's number of donuts (no credit for 3.OA.5). The equations presented do not sufficiently reflect the word problem (no credit for MP2). Although there appears to be an attempt to use known products to find unknown totals (the student verifies $3 \times 9 = 27$ by writing $9 + 9 = 18$, $18 + 9 = 27$), it is not sufficiently clear or explained (no credit for MP4). The calculations provided do not show sufficient attention to precision, as one of them is missing the equals sign (no credit for MP6), nor does the work provide evidence of understanding how 2×9 and 3×9 can be used to determine 5×9 (no credit for MP7).

Total Awarded Points: 1 out of 6

Task 4. How Many More? Task

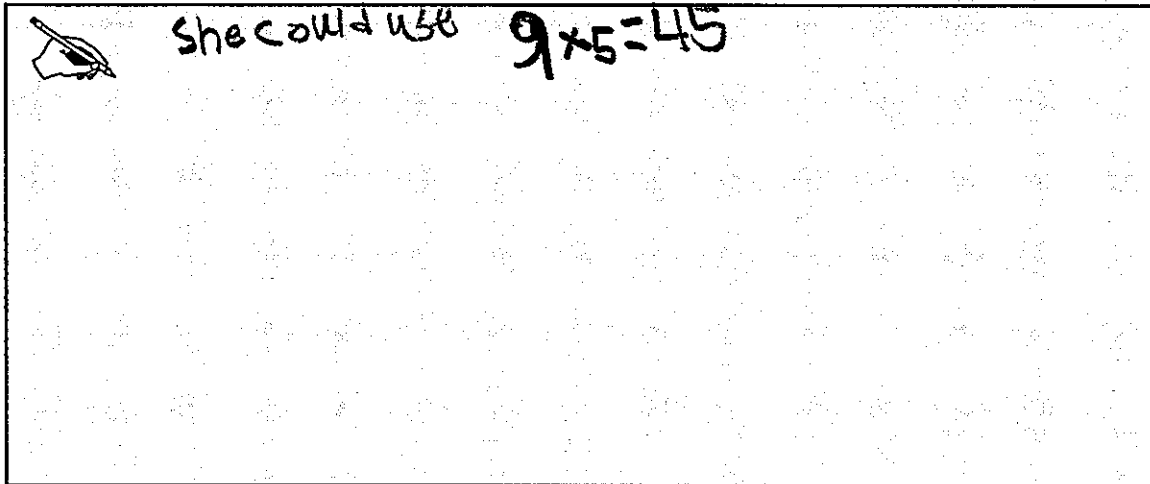
Sam has 3 boxes of donuts. He has 9 donuts in each box.

Anne has 5 boxes of donuts. She has 9 donuts in each box.

Anne has more donuts than Sam does.

She claims that she can figure out her amount of donuts by using what she knows about Sam's 3 boxes of donuts with 9 donuts in each box.

Draw a picture and write an equation to show how Anne can use Sam's situation to find the number of donuts that she has in 5 boxes.



She could use $9 \times 5 = 45$



Guide 9

Litho 30152

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

Total Practice Points: 0

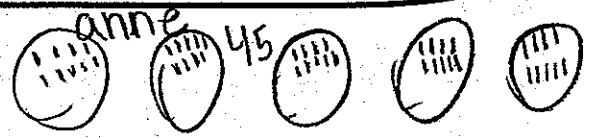
The equation displays understanding of equal groups with 9 objects (3.OA.1), but the absence of Sam's total does not allow consideration of whether the student uses it to find Anne's total (no credit for 3.OA.5). Likewise, the equation does not contextualize the word problem (no credit for MP2). There is no attempt to use known products to determine unknown totals (no credit for MP4), and the student does not draw a diagram or explain his thinking (no credit for MP6). Work does not show how 2×9 and 3×9 are used to determine 5×9 (no credit for MP7).

Total Awarded Points: 1 out of 6

Task 4. How Many More? Task

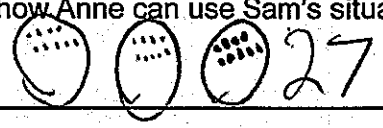
Sam has 3 boxes of donuts. He has 9 donuts in each box.
 Anne has 5 boxes of donuts. She has 9 donuts in each box.


Anne has more donuts than Sam does.



She claims that she can figure out her amount of donuts by using what she knows about Sam's 3 boxes of donuts with 9 donuts in each box.

Draw a picture and write an equation to show how Anne can use Sam's situation to find the number of donuts that she has in 5 boxes.



 I draw a picture and got my answer



REVIEW YOUR WORK IF YOU HAVE TIME.

Guide 10

Litho 30093

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

Total Practice Points: 0

The two diagrams display understanding of equal groups with 9 objects (3.OA.1), but Sam's total is not used to calculate Anne's number of donuts (no credit for 3.OA.5). There are no equations (no credit for MP2, no credit for MP6). The diagrams do not show how known facts can be used to find unknown results (no credit for MP4), nor do they display an understanding that 2×9 and 3×9 can be combined to calculate 5×9 (no credit for MP7).

Total Awarded Points: 1 out of 6

Task 4. How Many More? Task

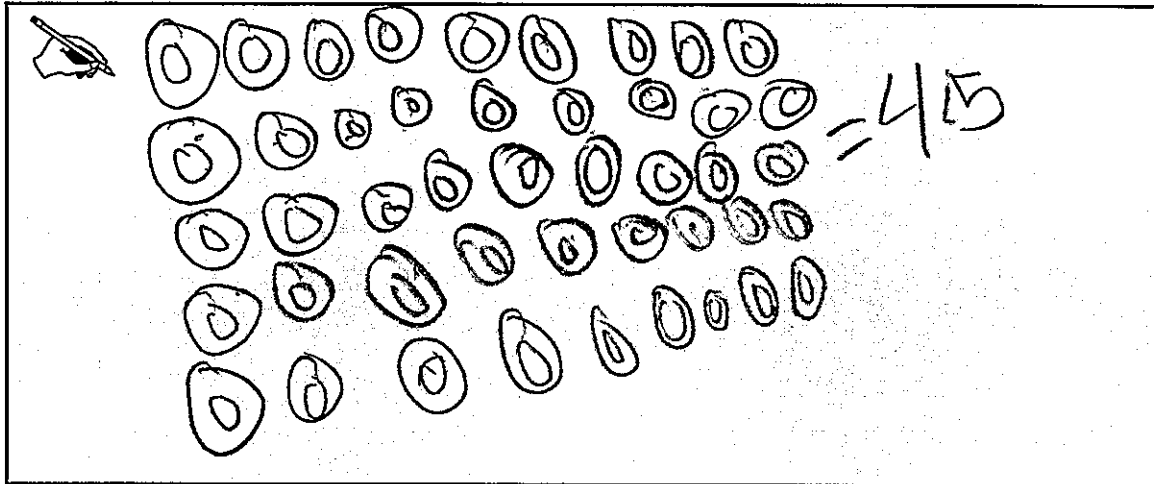
Sam has 3 boxes of donuts. He has 9 donuts in each box.

Anne has 5 boxes of donuts. She has 9 donuts in each box.

Anne has more donuts than Sam does.

She claims that she can figure out her amount of donuts by using what she knows about Sam's 3 boxes of donuts with 9 donuts in each box.

Draw a picture and write an equation to show how Anne can use Sam's situation to find the number of donuts that she has in 5 boxes.



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Guide 11

Litho 30035

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

Total Practice Points: 0

This response includes a single diagram with five rows of nine objects each (3.OA.1) and the total for Anne's product. Sam's total is not used to find the total (no credit for 3.OA.5), and there are no equations presented (no credit for MP2, no credit for MP6). The student does not show how known facts can be used to find unknown results (no credit for MP4) and does not display understanding that 2×9 and 3×9 can be combined to calculate 5×9 (no credit for MP7).

Total Awarded Points: 1 out of 6

Task 4. How Many More? Task


Sam has 3 boxes of donuts. He has 9 donuts in each box.

Anne has 5 boxes of donuts. She has 9 donuts in each box.

Anne has more donuts than Sam does.

She claims that she can figure out her amount of donuts by using what she knows about Sam's 3 boxes of donuts with 9 donuts in each box.

Draw a picture and write an equation to show how Anne can use Sam's situation to find the number of donuts that she has in 5 boxes.

 Well, since Anne has 5 boxes with 9 donuts in each, and Sam has only 3 boxes of 9 donuts in each. $5 > 3$.

Also,
$$\begin{array}{r} 5 \\ \times 9 \\ \hline 45 \end{array} \quad \begin{array}{r} 3 \\ \times 9 \\ \hline 27 \end{array} \quad 45 > 27$$



Total Content Points: 0

Total Practice Points: 0

The student does not use diagrams or equations (no credit for 3.OA.1), nor is there evidence the student has used Sam's total to calculate Anne's total (no credit for 3.OA.5). Without equations and diagrams, attention to precision cannot be evaluated (no credit for MP2, no credit for MP6). The student has not shown how known facts can be used to find unknown results (no credit for MP4). The student does not display understanding that 2×9 and 3×9 can be composed to determine 5×9 (no credit for MP7).

Total Awarded Points: 0 out of 6