Tennessee Comprehensive Assessment Program / Mathematics
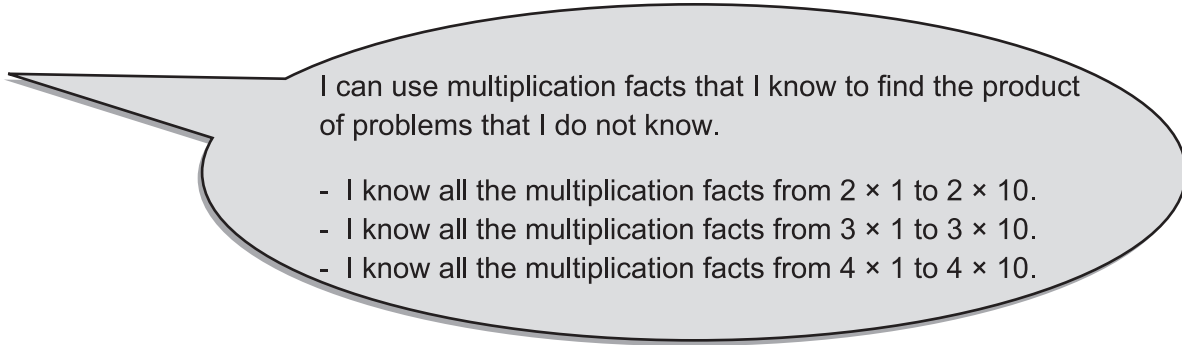
TCAP/CRA PILOT 2012
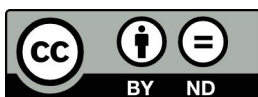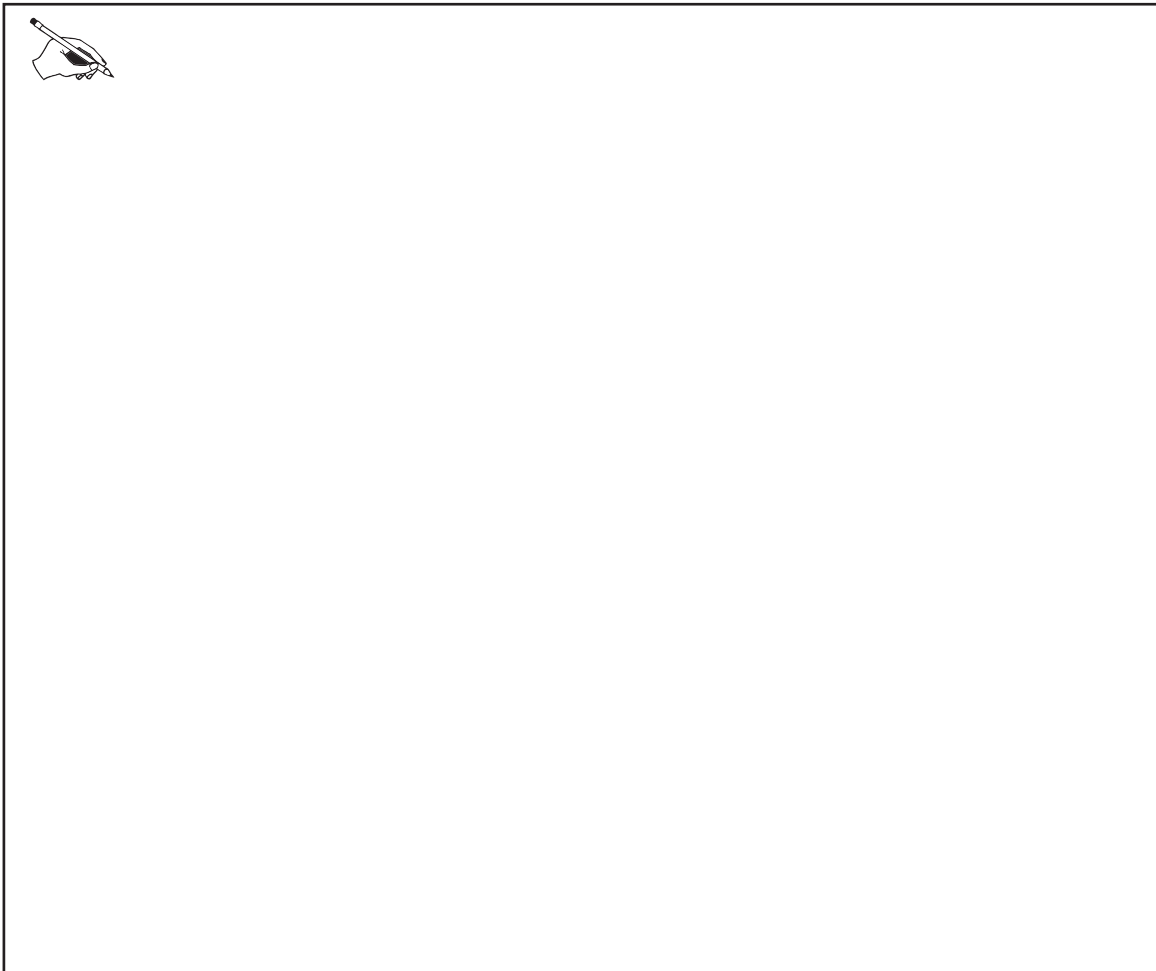

Task 3 : Helping Amber

Scoring Guide

Task 3. Helping Amber Task

Amber says:

> I can use multiplication facts that I know to find the product of problems that I do not know.
>
> - I know all the multiplication facts from 2 × 1 to 2 × 10.
> - I know all the multiplication facts from 3 × 1 to 3 × 10.
> - I know all the multiplication facts from 4 × 1 to 4 × 10.

Use diagrams, numbers, and words to show Amber how other multiplication facts that she already knows can be used to find the answer to 7 × 8. Convince her that the facts that she knows will give her the product of 7 × 8.

3. Helping Amber Task Scoring Guide

The CCSS for Mathematical Content (2 points)

3.OA.1   Drawing or equations indicate an understanding of equal groups of objects   _____
        (7 groups of 8 or 8 groups of 7).

3.OA.5   Drawing or equations indicate how known facts are used to determine 7 x 8.   _____

                                                      Total Content Points _____

The CCSS for Mathematical Practices (4 points)

MP1   Work indicates that some degree of planning occurred; simpler problems are   _____
      considered, drawings are made, and a relationship to 7 x 8 is made.

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

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 indicates that the student understands that properties of operations can be   _____
      used to find unknown products using known products.

      (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 x 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 x 4 = 24 is known, then 4 x 6 = 24 is also known. (Commutative property of multiplication.) 3 x 5 x 2 can be found by 3 x 5 = 15, then 15 x 2 = 30, or by 5 x 2 = 10, then 3 x 10 = 30. (Associative property of multiplication.) Knowing that 8 x 5 = 40 and 8 x 2 = 16, one can find 8 x 7 as 8 x (5 + 2) = (8 x 5) + (8 x 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.

Amber says:

I can use multiplication facts that I know to find the product of problems that I do not know.

- I know all of the two multiplication facts up to 2 × 10.
- I know all of the three multiplication facts up to 3 × 10.
- I know all of the four multiplication facts up to 4 × 10.

Use diagrams, numbers, and words to show Amber how other multiplication facts that she already knows can be used to find the answer to 7 × 8. Convince her that the facts that she knows will give her the product of 7 × 8.

4 X 7 = 28 so since 4+4=8 then you can add 28+28 like this:
$$\begin{array}{r} 28 \\ +28 \\ \hline 56 \end{array}$$
and since that answer is 56, then 7x8=56. :D

Guide 1   Litho 30078

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

Total Practice Points: 4   (MP1, MP4, MP6, MP7)

The student's work indicates that she interprets 7×8 as eight groups of 7 (3.OA.1). The student recognizes the constraints of the problem and reduces the eight groups into two smaller groups of 4 ($4 \times 7 = 28$, $4 + 4 = 8$) to solve the problem (3.OA.5, MP1). The student uses simplified equations ($4 \times 7 = 28$, $4 + 4 = 8$, $28 + 28 = 56$) to find the answer (MP4). She performs the operations precisely and finds the correct answer—56 (MP6). The student demonstrates understanding that 8 groups can be distributed as 4 groups and 4 groups (MP7).

Total Awarded Points: 6 out of 6

Task 3. Helping Amber Task

Amber says:

> I can use multiplication facts that I know to find the product of problems that I do not know.
>
> - I know all of the two multiplication facts up to 2 × 10.
> - I know all of the three multiplication facts up to 3 × 10.
> - I know all of the four multiplication facts up to 4 × 10.

Use diagrams, numbers, and words to show Amber how other multiplication facts that she already knows can be used to find the answer to 7 × 8. Convince her that the facts that she knows will give her the product of 7 × 8.

> ✎ You can do 4 X 8 and you know that = 32 then you can do 3 X 8 whigh cay you know is 24 and 3+4= 7 and you been Itiming thoose number

by 8 so you can do the problem 32 + 24 = 56 because thase are thel anwsers to the 7 56 problems and so you just add them.

Guide 2   Litho 30371

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

Total Practice Points: 4   (MP1, MP4, MP6, MP7)

The student interprets 7×8 as seven groups of 8 (3.OA.1). The student further recognizes those multiplication facts that Amber knows, and reduces the seven groups into smaller groups ("and $3 + 4 = 7$ and you been timing thoose number by 8") in order to find the answer (3.OA.5). The student uses the constraints given in the prompt and plans a solution using simpler problems by reducing 7 into component parts 3 and 4 (MP1). The student uses simplified equations ($4 \times 8 = 32$, $3 \times 8 = 24$, $32 + 24 = 56$) to find the answer (MP4). The student performs the operations precisely and finds the correct answer—56 (MP6). He also demonstrates understanding that 7 groups can be distributed as 4 groups and 3 groups (MP7).

Total Awarded Points: 6 out of 6

Task 3. Helping Amber Task

Amber says:

I can use multiplication facts that I know to find the product of problems that I do not know.

- I know all of the two multiplication facts up to 2 × 10.
- I know all of the three multiplication facts up to 3 × 10.
- I know all of the four multiplication facts up to 4 × 10.

Use diagrams, numbers, and words to show Amber how other multiplication facts that she already knows can be used to find the answer to 7 × 8. Convince her that the facts that she knows will give her the product of 7 × 8.

She can brake it bown into multiplication facts she knows

7×8 into
$$3\times8=24$$
$$2\times8=16$$
$$2\times8=+16$$
$$\overline{50}$$

Guide 3   Litho 30051

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

Total Practice Points: 3   (MP1, MP4, MP7)

The student states that Amber "…can brake it bown into multlplication facts she knows."
The student recognizes seven groups of eight (3.OA.1) can be composed of three separate
groups of eight and reduces the factor of 7 into a group of 3 eights (3×8) and 2 groups of
2 eights (2×8) (3.OA.5). The student has planned a process by considering simpler
problems within the constraints of Amber's knowledge and relates those to 7×8 (MP1).
The student uses simplified equations ($3 \times 8 = 24$, $2 \times 8 = 16$, $2 \times 8 = 16$, $24 + 16 + 16 =$
50) to find the solution (MP4). The student performs some of the operations accurately
by arriving at the products of her simplified equations. She is not precise in adding these
products and finds an answer—50—which is incorrect (no credit for MP6). The student
understands that 7 can be distributed as 3 groups + 2 groups + 2 groups (MP7).

Total Awarded Points: 5 out of 6

Task 3. Helping Amber Task

Amber says:

I can use multiplication facts that I know to find the product of problems that I do not know.

- I know all of the two multiplication facts up to 2 × 10.
- I know all of the three multiplication facts up to 3 × 10.
- I know all of the four multiplication facts up to 4 × 10.

Use diagrams, numbers, and words to show Amber how other multiplication facts that she already knows can be used to find the answer to 7 × 8. Convince her that the facts that she knows will give her the product of 7 × 8.

She could draw the array 8x5. Then she can draw two more dots on the end on each five dots that she drew.

Litho#: 30052

Guide 4   Litho 30052

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

Total Practice Points: 2   (MP1, MP7)

The student suggests that Amber "could draw the array 8 × 5." In her next statement, the student establishes that she conceives of eight groups of seven dots composed of one group of eight rows of five dots and one group of eight rows of two dots ("draw two more dots on the end on each five dots that she drew"). The student recognizes eight groups of 7 (3.OA.1) and reduces the factor of 7 into smaller components: 5 and 2 (3.OA.5). The student has planned a solution involving simpler problems (using 5 and 2 as components of 7) and relates those to 7 × 8 (MP1). Although the student describes the array, she does not create the array to model her work (no credit for MP4). The student does not perform operations to find the solution, or demonstrate that the process she describes will result in the correct answer (no credit for MP6). The student successfully demonstrates the distributive property of multiplication by recognizing that 7 × 8 is equal to eight groups of 5 and eight groups of 2 (MP7).
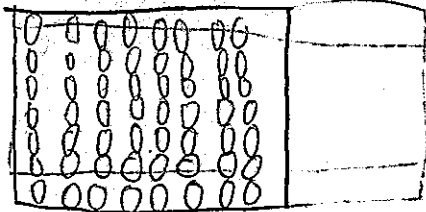
Total Awarded Points: 4 out of 6

Amber says:

I can use multiplication facts that I know to find the product of problems that I do not know.

- I know all of the two multiplication facts up to 2 × 10.
- I know all of the three multiplication facts up to 3 × 10.
- I know all of the four multiplication facts up to 4 × 10.

Use diagrams, numbers, and words to show Amber how other multiplication facts that she already knows can be used to find the answer to 7 × 8. Convince her that the facts that she knows will give her the product of 7 × 8.

She can make a chart. add
8+8+8+8+8+8+8=56

Guide 5   Litho 30218

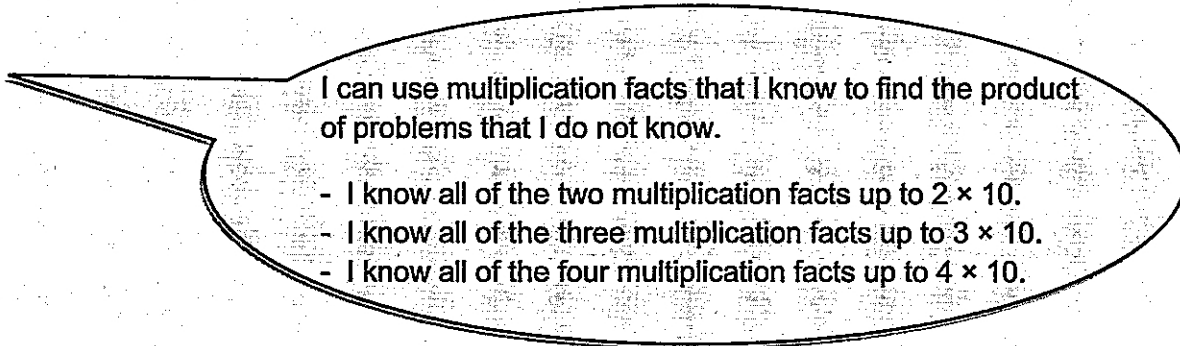Total Content Points: 1   (3.OA.1)

Total Practice Points: 2   (MP 4, MP6)

The student has interpreted 7×8 as seven groups of 8 (3.OA.1) but does not attempt to decompose the seven groups into smaller component groups (no credit for 3.OA.5). The student does not attempt to reduce the expression 7×8 into simpler multiplication problems to plan a solution (no credit for MP1). The student shows a chart model of seven rows of 8 circles, and an equation showing an attempt to simplify the problem by adding seven groups of 8 to arrive at the solution (MP4). The student precisely adds the seven groups of 8 to arrive at the correct solution—56 (MP6). The student does not demonstrate an understanding of the distributive property of multiplication by reducing one of the factors and using known products to find unknown products (no credit for MP7).
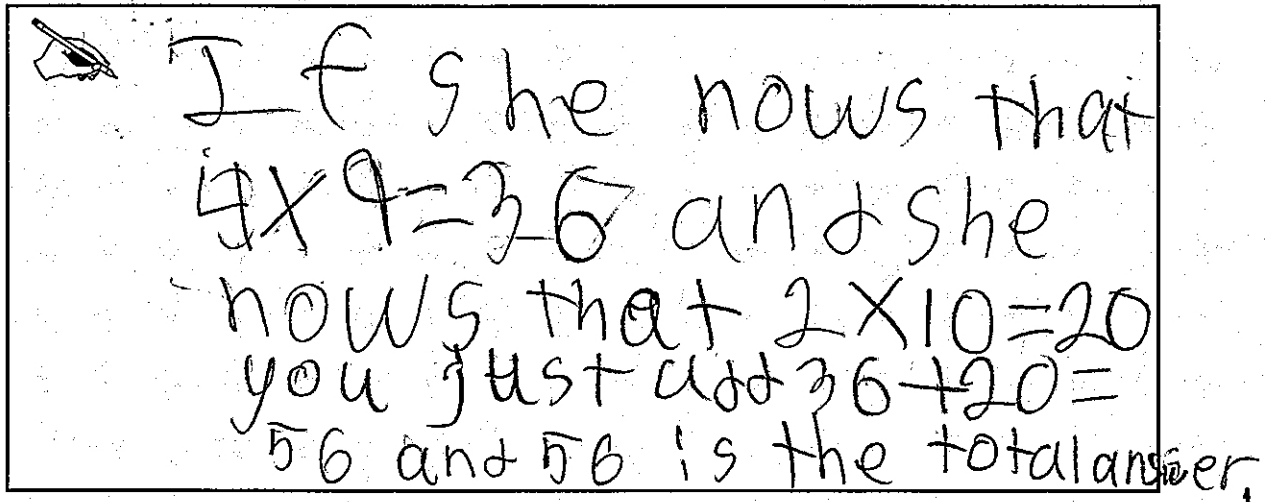
Total Awarded Points: 3 out of 6

Amber says:

I can use multiplication facts that I know to find the product of problems that I do not know.

- I know all of the two multiplication facts up to 2 × 10.
- I know all of the three multiplication facts up to 3 × 10.
- I know all of the four multiplication facts up to 4 × 10.

Use diagrams, numbers, and words to show Amber how other multiplication facts that she already knows can be used to find the answer to 7 × 8. Convince her that the facts that she knows will give her the product of 7 × 8.

If she nows that
4X9=36 and she
nows that 2X10=20
you just add 36+20=
56 and 56 is the total answer.

Guide 6   Litho 30002

Total Content Points: 0

Total Practice Points: 2   (MP4, MP6)

The student knows the product of 7×8 and attempts to reach that product using multiplication facts that Amber knows. There is no indication of equal groups of eight or seven objects (no credit for 3.OA.1) and no attempt to reduce 7 or 8 into smaller components (no credit for 3.OA.5). Although simpler problems are considered, the student does not establish a relationship between the equations he suggests and 7×8 (no credit for MP1). The student does use simplified equations ($4 \times 9 = 36$, $2 \times 10 = 20$, $36 + 20 = 56$) to find the answer to 7×8 (MP4) and performs the operations precisely (MP6). The student does not demonstrate an understanding of the distributive property of multiplication involving either factor 7 or 8 (no credit for MP7).

Total Awarded Points: 2 out of 6

Amber says:

I can use multiplication facts that I know to find the product of problems that I do not know.

- I know all of the two multiplication facts up to 2 × 10.
- I know all of the three multiplication facts up to 3 × 10.
- I know all of the four multiplication facts up to 4 × 10.

Use diagrams, numbers, and words to show Amber how other multiplication facts that she already knows can be used to find the answer to 7 × 8. Convince her that the facts that she knows will give her the product of 7 × 8.

7×8=56. I know Amber knows 4×10=40. 40 is the closet number of all the facts Amber knows to 56. I know Amber also knows 4×4=16. 40+16=56. 56 is the product of 7×8.

Guide 7   Litho 30016

Total Content Points: 0

Total Practice Points: 2   (MP4, MP6)

The student knows the product of 7×8 and states it at the beginning of his response
"$7 \times 8 = 56$." He then attempts to work toward the product starting with the 'closet'
product Amber knows—4×10. The student extends this process by determining the
product of 4×4 (16) and adding that product to his previous product (40) to reach 56.
The student has not indicated an understanding of equal groups of 7s and 8s (no credit for
3.OA.1) nor has he attempted to reduce either of the original factors into smaller
components (no credit for 3.OA.5). The student's does not relate the simpler problems he
uses to 7×8 except by stating that they have the same product (no credit for MP1). The
student does perform simplified equations to find the answer to 7×8 (MP4). The
equations are accurate and performed correctly (MP6). There is no understanding of the
distributive property of multiplication as applied to factors 7 and 8 (no credit for MP7).

Total Awarded Points: 2 out of 6

Task 3. Helping Amber Task

Amber says:

I can use multiplication facts that I know to find the product of problems that I do not know.

- I know all of the two multiplication facts up to 2 × 10.
- I know all of the three multiplication facts up to 3 × 10.
- I know all of the four multiplication facts up to 4 × 10.

Use diagrams, numbers, and words to show Amber how other multiplication facts that she already knows can be used to find the answer to 7 × 8. Convince her that the facts that she knows will give her the product of 7 × 8.

First you have to now what
7×8 is 7×8=56 and
8×7=56 if is that simple

Guide 8   Litho 30197

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

Total Practice Points: 0

The student knows the product of 7×8 ("First you have to now what 7×8 is...") and does not recognize the limitations of Amber's knowledge. The student then indicates that seven groups of 8 are equal to eight groups of 7 with the equation $7 \times 8 = 56$ and $8 \times 7 = 56$, which is enough to demonstrate an understanding of equal groups of objects, and how they relate to multiplication (3.OA.1). She does not attempt to reduce either factor—7 or 8—in an attempt to work within the limitations of Amber's knowledge (no credit for 3.OA.5). The student's does not pursue a solution within the given constraints of the task (no credit for MP1), model these problems with a diagram or equations (no credit for MP4), or find unknown products with known products (no credit for MP7). The correct multiplication of 7×8 is insufficient to demonstrate the ability to attend to precision (no credit for MP6).
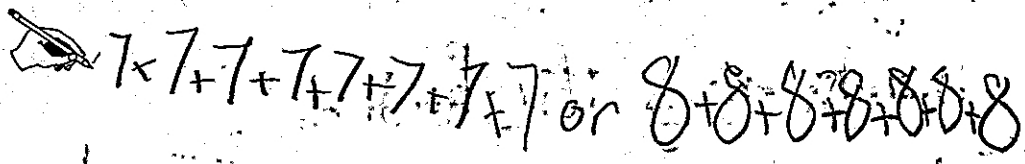
Total Awarded Points: 1 out of 6

Task 3. Helping Amber Task

Amber says:

I can use multiplication facts that I know to find the product of problems that I do not know.

- I know all of the two multiplication facts up to 2 × 10.
- I know all of the three multiplication facts up to 3 × 10.
- I know all of the four multiplication facts up to 4 × 10.

Use diagrams, numbers, and words to show Amber how other multiplication facts that she already knows can be used to find the answer to 7 × 8. Convince her that the facts that she knows will give her the product of 7 × 8.

7+7+7+7+7+7+7+7 or 8+8+8+8+8+8+8

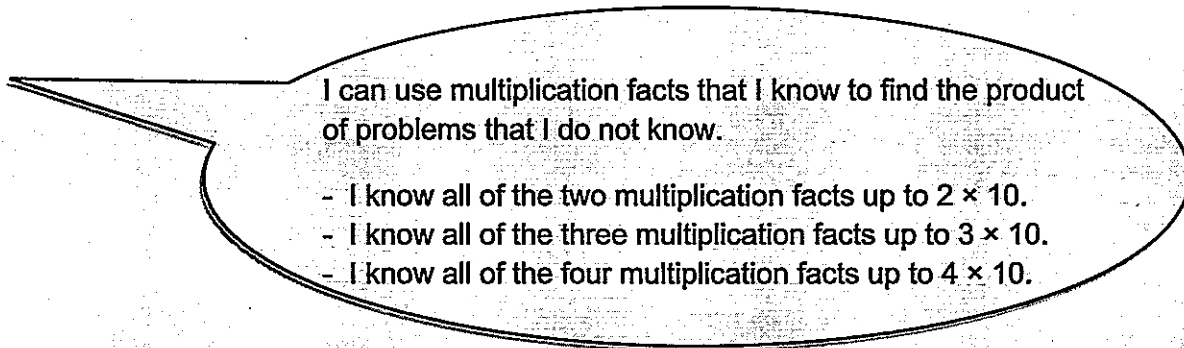Guide 9   Litho 30466

Total Content Points: 1   (3.OA.1)
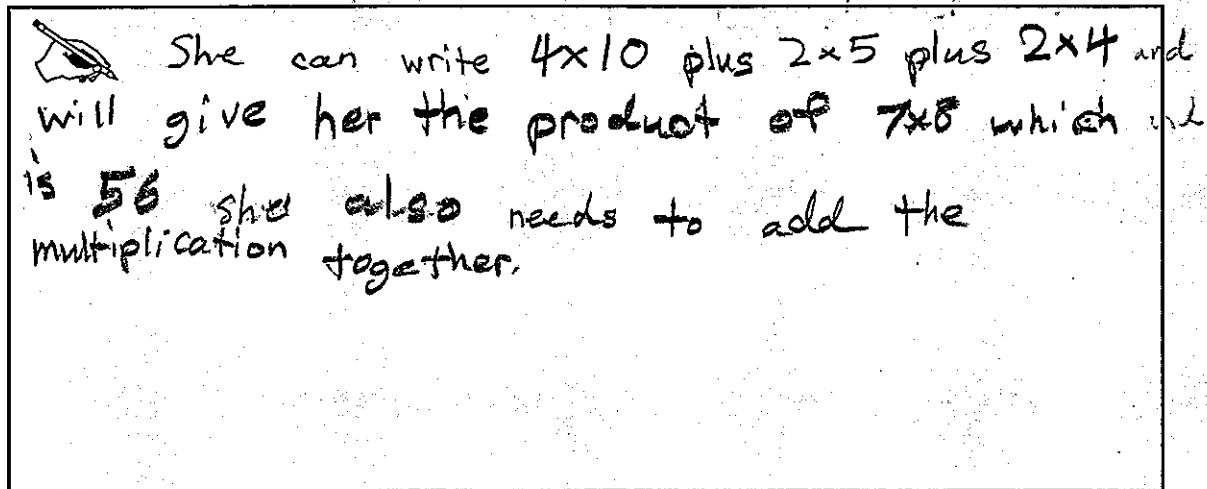
Total Practice Points: 0

The student indicates that eight 7s added together is equivalent to seven 8s added together, which shows an understanding of equal groups of objects (3.OA.1). The student does not attempt to reduce 7 or 8 into smaller components to reflect the limitations of Amber's knowledge (no credit for 3.OA.5). The student's addition of 7s and 8s does not lead him to pursue a solution (no credit for MP1), provide an accurate diagram or equation (no credit for MP4), or find unknown products using known products (no credit for MP7). With no equations or explanations provided, the student's attention to precision cannot be determined (no credit for MP6).

Total Awarded Points: 1 out of 6

Amber says:

> I can use multiplication facts that I know to find the product of problems that I do not know.
>
> - I know all of the two multiplication facts up to 2 × 10.
> - I know all of the three multiplication facts up to 3 × 10.
> - I know all of the four multiplication facts up to 4 × 10.

Use diagrams, numbers, and words to show Amber how other multiplication facts that she already knows can be used to find the answer to 7 × 8. Convince her that the facts that she knows will give her the product of 7 × 8.

She can write 4×10 plus 2×5 plus 2×4 and will give her the product of 7×8 which is 56 she also needs to add the multiplication together.

Guide 10   Litho 30394

Total Content Points: 0

Total Practice Points: 0

The student knows the product of 7×8, which is 56. She then attempts to work toward the product starting with the highest product Amber knows (4×10). The student then extends the process by adding the product of 2×5 and the product of 2×4. The student has not indicated an understanding of equal groups of objects using the factors 7 and 8 (no credit for 3.OA.1). The student also does not attempt to reduce either factor—7 or 8—into smaller components (no credit for 3.OA.5). The student does not relate the simpler expressions she uses to 7×8 (no credit for MP1). The student does not use equations or diagrams to model the multiplication of groups of 7 or 8 (no credit for MP4). The student makes an error in her process by adding the product of 2×4 to the other products, which will not give the result of 56; therefore, the process is incorrect and does not show attention to precision (no credit for MP6). No evidence is given of using the distributive property with the factors 7 and 8 (no credit for MP7).

Total Awarded Points: 0 out of 6

Task 3. Helping Amber Task

Amber says:

I can use multiplication facts that I know to find the product of problems that I do not know.

- I know all of the two multiplication facts up to 2 × 10.
- I know all of the three multiplication facts up to 3 × 10.
- I know all of the four multiplication facts up to 4 × 10.

Use diagrams, numbers, and words to show Amber how other multiplication facts that she already knows can be used to find the answer to 7 × 8. Convince her that the facts that she knows will give her the product of 7 × 8.

1 X 56 = 56   which you should know and it's
= with   7 X 8 = 56

Guide 11   Litho 30361
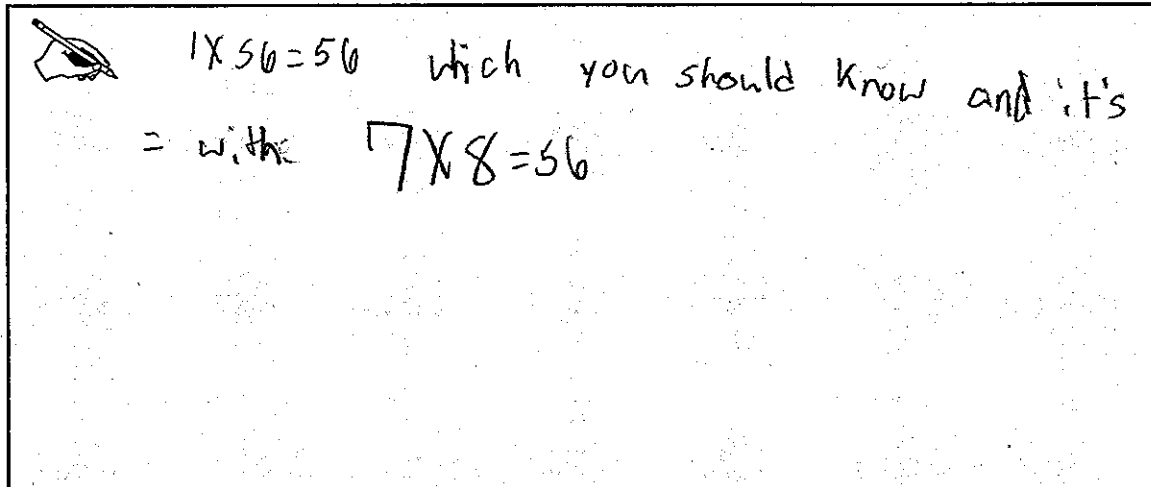
Total Content Points: 0

Total Practice Points: 0

The student knows that 7×8 is 56 and offers two factors of 56—1 and 56. The student then asserts that two factors of 56 are 7 and 8. The student's approach assumes knowledge of the product of 7 and 8 and does not address equal groups of objects (no credit for 3.OA.1) or how factors 7 or 8 can be reduced into smaller components whose multiplication facts are within Amber's knowledge (no credit for 3.OA.5). The student's use of knowledge of the product of 7×8 does not lead him to demonstrate understanding of the problem and the given constraints (no credit for MP1), use models (no credit for MP4), demonstrate precision (no credit for MP6), or make use of structures that would demonstrate knowledge of the structure of multiplication (no credit for MP7).

Total Awarded Points: 0 out of 6

Amber says:

> I can use multiplication facts that I know to find the product of problems that I do not know.
>
> - I know all of the two multiplication facts up to 2 × 10.
> - I know all of the three multiplication facts up to 3 × 10.
> - I know all of the four multiplication facts up to 4 × 10.

Use diagrams, numbers, and words to show Amber how other multiplication facts that she already knows can be used to find the answer to 7 × 8. Convince her that the facts that she knows will give her the product of 7 × 8.

> She does not know 7×8 because she only knows the tens, and 7×8 = 56, and she only knows 4×10, 3×10, and 2×10, and 56 is a Higher number than 40.

Guide 12   Litho 30377

Total Content Points: 0

Total Practice Points: 0

The student knows that the product of 7×8 is 56 and asserts that Amber does not know 7×8 because "she only knows the tens." The student misreads the information given in the beginning of the task and concludes that Amber knows only three products—4×10, 3×10 and 2×10. The student concludes that Amber cannot know 7×8 since "56 is a Higher number than 40." The student's misreading of the prompt does not lead her to address equal groups of objects (no credit for 3.OA.1) or to reduce one of the factors into smaller components (no credit for 3.OA.5). The student does not persevere in solving the problem (no credit for MP1), use models (no credit for MP4), demonstrate precision (no credit for MP6), or make use of structures that would demonstrate content knowledge (no credit for MP7).

Total Awarded Points: 0 out of 6