SECURE MATERIAL – Reader Name: _____

Tennessee Comprehensive Assessment Program

TCAP/CRA

2014

3

Phase III

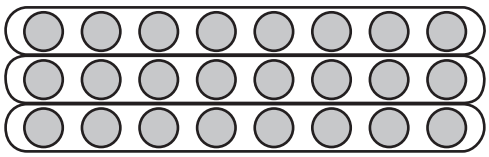
Showing Division Task

Anchor Set

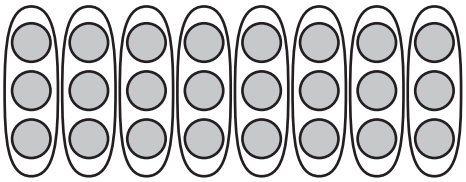
Showing Division Task

Jennifer and Levon draw diagrams to solve the equation 24 ÷ ? = 8.

Jennifer's Diagram



Levon's Diagram



Both of their diagrams are correct, but they show different ways of solving the equation.

a. Write the unknown number that makes the equation 24 ÷ ? = 8 true.

b. Explain in words why both diagrams show 24 ÷ ? = 8.

Showing Division Task

c. Fill in the blank in each equation below with the number that makes the equation true. Make a diagram to show each equation. For each equation, explain in words how each number is shown in the diagram.

21 ÷ _____ = 3

6 × _____ = 24

Scoring Guide

The CCSS for Mathematical Content (1 point)

3.OA.A.4 Solves multiplication and division equations with a missing factor or divisor: 24 ÷ ? = 8, 21 ÷ ? = 3, and 6 × ? = 24. _____

(1 Point)

The CCSS for Mathematical Practice (3 points)

MP3 Constructs a valid argument in part b as to why *both diagrams* represent the equation 24 ÷ ? = 8**.** Student may do this by**:** _____

- stating that 24 was broken into 8 in one diagram and 3 in the other diagram;
- stating that the 24 items can be broken into groups of 8 or into 8 groups;
- stating that the 24 items can be arranged so that there are 8 columns with 3 items in each and that the items can also be arranged so that there are 3 rows with 8 items in each;
- stating that 24 can be broken into 8 groups with 3 in each group and that 24 can be broken into 3 groups with 8 in each group; or
- stating that the multiplication expression 3 × 8 can be used to solve the missing divisor division equation and that 3 × 8 can be shown as 3 columns with 8 in each column and also as 3 rows with 8 in each row.

(1 Point)
(MP3: Construct viable arguments and critique the reasoning of others.)

MP4 Creates diagrams that model each equation in part c. _____
(1 Point)
(MP4: Model with mathematics.)

MP6 Uses precise language in explanations in parts b and c by referencing the number of groups, the amount in each group, or the number of columns (rows) and the amount in each column (row); or the dividend, divisor, quotient, factor, or product. _____
(1 Point)
(MP6: Attend to precision.)

TOTAL POINTS: 4

The CCSS for Mathematical Content Addressed In This Task

Represent and solve problems involving multiplication and division.	
3.OA.A.4	Determine the unknown whole number in a multiplication or division equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 x ? = 48, 5 = ? ÷ 3, 6 x 6 = ?*

The CCSS for Mathematical Practice*

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.

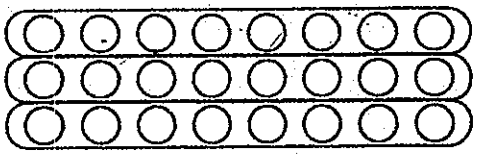
* Gray type indicates Mathematical Practices not addressed in this assessment.

A-1a

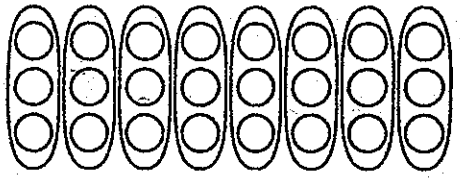
Showing Division Task

Jennifer and Levon draw diagrams to solve the equation 24 ÷ ? = 8.

Jennifer's Diagram



Levon's Diagram



Both of their diagrams are correct, but they show different ways of solving the equation.

a. Write the unknown number that makes the equation 24 ÷ ? = 8 true.

3

$24 \div 3 = 8$

b. Explain in words why both diagrams show 24 ÷ ? = 8.

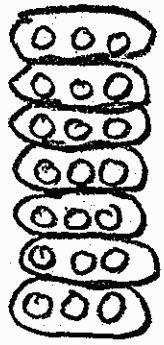
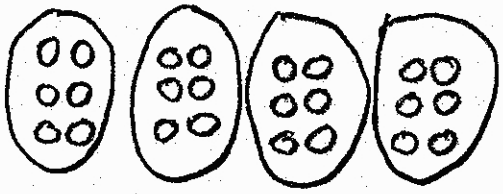
They both show $24 \div 3 = 8$ because one of them had divided 24 into 3 groups and in each group there is eigh dots. Also one divide 24 into 8 groups and in each group there is 3.

Litho#: 00493200170

A-1b

Showing Division Task

c. Fill in the blank in each equation below with the number that makes the equation true. Make a diagram to show each equation. For each equation, explain in words how each number is shown in the diagram.

$21 \div \underline{7} = 3$	$6 \times \underline{4} = 24$
	
I divided 21 into 7 groups and in each group there is 3.	I put 6 in each group. There are 24 dots in all. Also there is 4 groups of six.

Anchor 1 Litho 00493200170

Total Content Points: 1 (3.OA.A.4)

Total Practice Points: 3 (MP3, MP4, MP6)

In Parts A and C, the student correctly solves the multiplication and division equations by providing the missing factors and divisors (3, 7, and 4) (3.OA.A.4). In Part B, the student constructs a valid argument why both diagrams represent the equation by stating that "one . . . divided 24 into 3 groups and in each group there is eigh dots. Also one divide 24 into 8 groups and in each group there is 3" (MP3). The student creates diagrams that model each equation in Part C (MP4). In both Parts B and C the student uses precise language in the explanations by referencing the number of groups and the amount in each group (MP6).

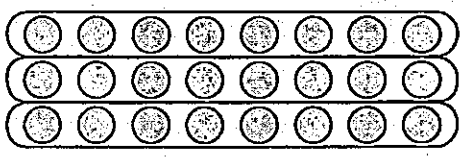
Total Awarded Points: 4 out of 4

A-2a

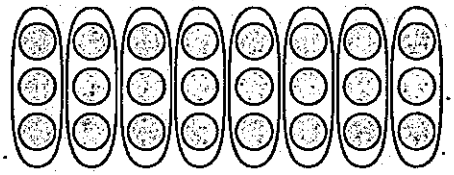
Showing Division Task

Jennifer and Levon draw diagrams to solve the equation 24 ÷ ? = 8.

Jennifer's Diagram

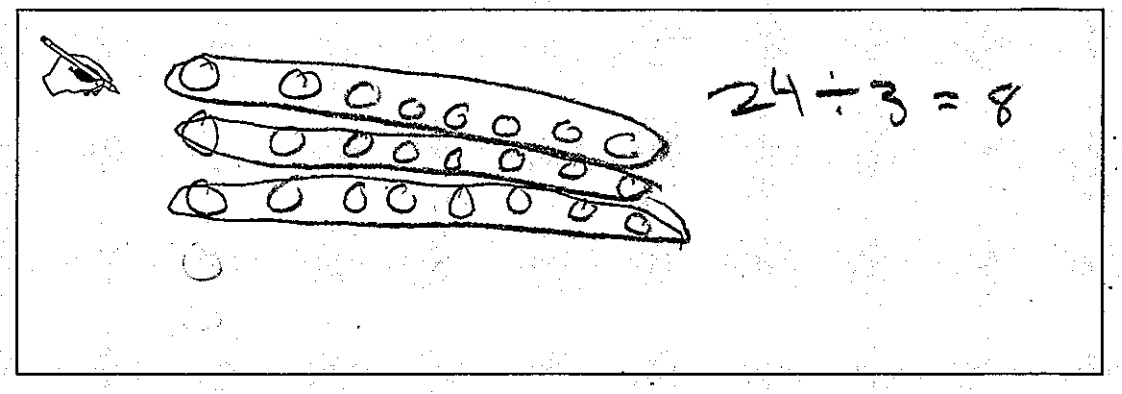


Levon's Diagram



Both of their diagrams are correct, but they show different ways of solving the equation.

a. Write the unknown number that makes the equation 24 ÷ ? = 8 true.



b. Explain in words why both diagrams show 24 ÷ ? = 8.

When you circle 8 dots you will get 3 groups. When you circle 3 dots you will get 8 groups.

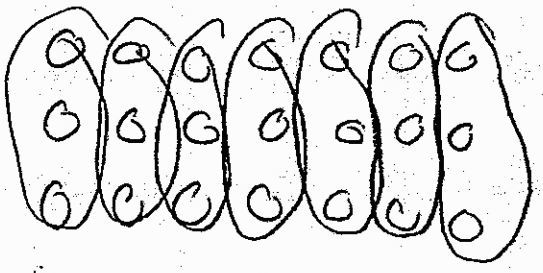
Litho#: 00053200173

A-2b

Showing Division Task

c. Fill in the blank in each equation below with the number that makes the equation true. Make a diagram to show each equation. For each equation, explain in words how each number is shown in the diagram.

$21 \div \underline{7} = 3$



When you draw a diagram of 21 circles and you circle 3 you will get 7 groups.

$6 \times \underline{4} = 24$

When you draw a diagram of 24 circles and you circle 6 you will get 4 groups.

Anchor 2 Litho 00053200173

Total Content Points: 1 (3.OA.A.4)

Total Practice Points: 2 (MP3, MP4)

In Parts A and C, the student correctly solves the multiplication and division equations by providing the missing factors and divisors (3, 7, and 4) (3.OA.A.4). In Part B, the student constructs a valid argument why both diagrams represent the equation by stating "When you circle 8 dots you will get 3 groups. When you circle 3 dots you will get 8 groups" (MP3). However, the student does not use precise language in the explanation, since circling 8 dots or 3 dots will result in one group of 8 or 3, not 3 groups or 8 groups, and the same precision error is repeated in Part C (no credit for MP6). The student creates diagrams that model each equation in Part C (MP4).

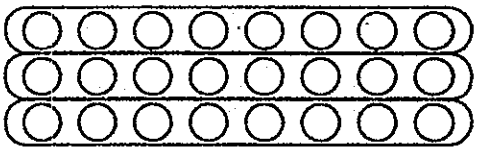
Total Awarded Points: 3 out of 4

A-3a

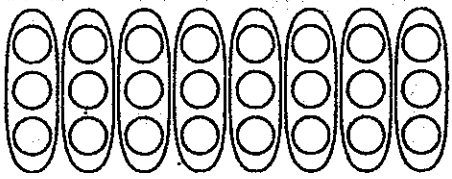
Showing Division Task

Jennifer and Levon draw diagrams to solve the equation 24 ÷ ? = 8.

Jennifer's Diagram



Levon's Diagram



Both of their diagrams are correct, but they show different ways of solving the equation.

a. Write the unknown number that makes the equation 24 ÷ ? = 8 true.

$24 \div ? = 8$

$24 \div 3 = 8$

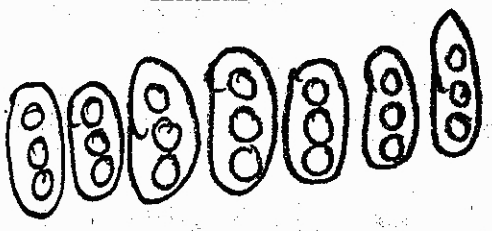
b. Explain in words why both diagrams show 24 ÷ ? = 8.

In Jennifer's Diagram it shows 3 rows and 8 in each row. In Levon's Diagram it shows 8 colums and 3 in each colum. In both diagram there are 24 in all.

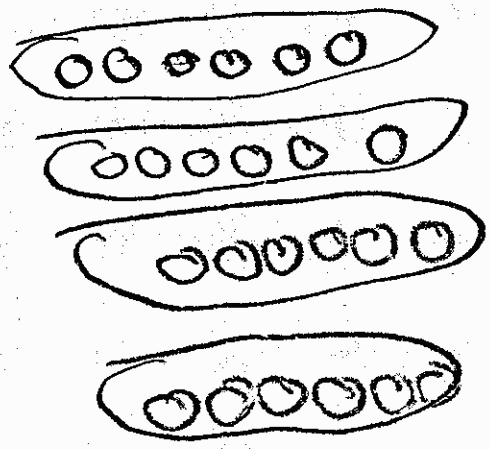
Showing Division Task

c. Fill in the blank in each equation below with the number that makes the equation true. Make a diagram to show each equation. For each equation, explain in words how each number is shown in the diagram.

$21 \div \underline{7} = 3$



$6 \times \underline{4} = 24$



Anchor 3 Litho 00073200170

Total Content Points: 1 (3.OA.A.4)

Total Practice Points: 2 (MP3, MP4)

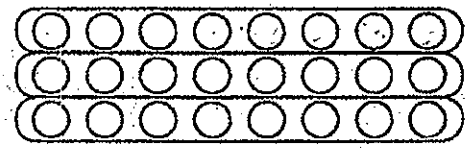
In Parts A and C, the student correctly solves the multiplication and division equations by providing the missing factors and divisors (3, 7, and 4) (3.OA.A.4). In Part B, by stating that Jennifer's diagram "shows 3 rows and 8 in each row" and Levon's diagram "shows 8 colums and 3 in each colum," and also by indicating that both diagrams have 24, the student constructs a valid argument why both diagrams represent the equation (MP3). The student creates diagrams that model each equation in Part C (MP4). Although the student uses precise language in Part B to explain why both diagrams show $24 \div ? = 8$, no explanations are given in Part C (no credit for MP6).

Total Awarded Points: 3 out of 4

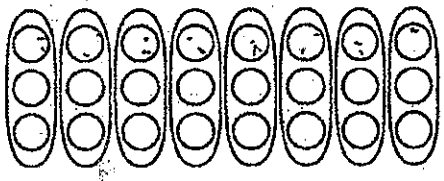
Showing Division Task

Jennifer and Levon draw diagrams to solve the equation 24 ÷ ? = 8.

Jennifer's Diagram



Levon's Diagram



Both of their diagrams are correct, but they show different ways of solving the equation.

a. Write the unknown number that makes the equation 24 ÷ ? = 8 true.

The unknown number is 3. Because 8, 16, and 24. In all that was 3 numbers. I started at 8 and ended 24.

8
16
24

b. Explain in words why both diagrams show 24 ÷ ? = 8.

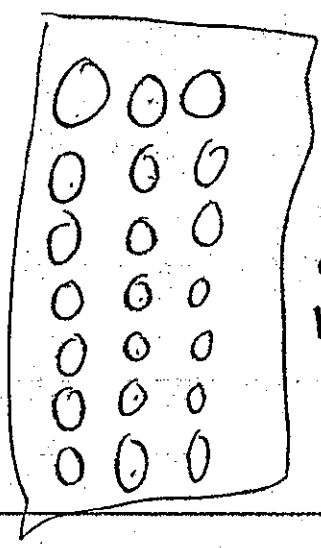
They both had 3 going vertical and 8 going horizontal. So 8 x 3 = 24.

Showing Division Task

c. Fill in the blank in each equation below with the number that makes the equation true. Make a diagram to show each equation. For each equation, explain in words how each number is shown in the diagram.

$21 \div \underline{7} = 3$

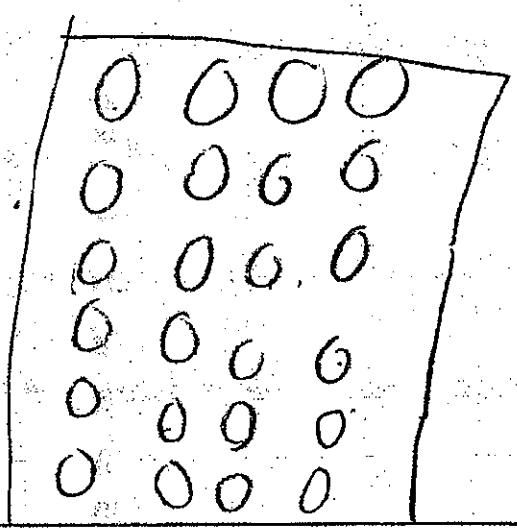
$3 \times 7 = 21$



In the diagram there is 3 going horizontal and 7 going vertical.

$6 \times \underline{4} = 24$

In the digram I've got 4 going horzontal and 6 going vertical. $6 \times 4 = 24$



Anchor 4 Litho 00163200170

Total Content Points: 1 (3.OA.A.4)

Total Practice Points: 3 (MP3, MP4, MP6)

In Parts A and C, the student correctly solves the multiplication and division equations by providing the missing factors and divisors (3, 7, and 4) (3.OA.A.4). In Part B, by disregarding the drawn circles and stating that "They both had 3 going vertical and 8 going horizontal. So $8 \times 3 = 24$", the student constructs a valid argument why both diagrams represent the equation (MP3). The student creates diagrams that model each equation in Part C (MP4). In Parts B and C, by not referencing the numbers 3 and 8 as groups, amounts in groups, columns, or rows, the student does not use precise language in the explanation (no credit for MP6).

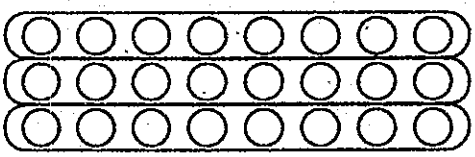
Total Awarded Points: 4 out of 4

A-5a

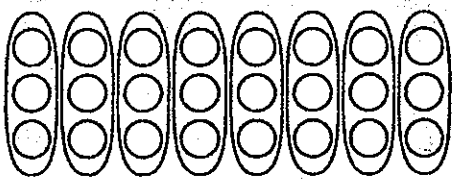
Showing Division Task

Jennifer and Levon draw diagrams to solve the equation 24 ÷ ? = 8.

Jennifer's Diagram



Levon's Diagram



Both of their diagrams are correct, but they show different ways of solving the equation.

a. Write the unknown number that makes the equation 24 ÷ ? = 8 true.

8 x 3 = 24 so 24 ÷ 3 = 8

b. Explain in words why both diagrams show 24 ÷ ? = 8.

because there are 3 rows and 8 colums in both diagrams.

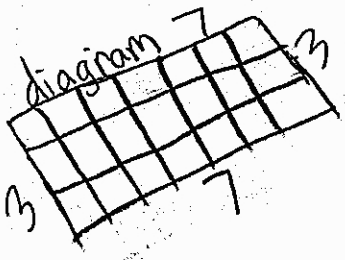
Litho#: 00123200170

Showing Division Task

c. Fill in the blank in each equation below with the number that makes the equation true. Make a diagram to show each equation. For each equation, explain in words how each number is shown in the diagram.

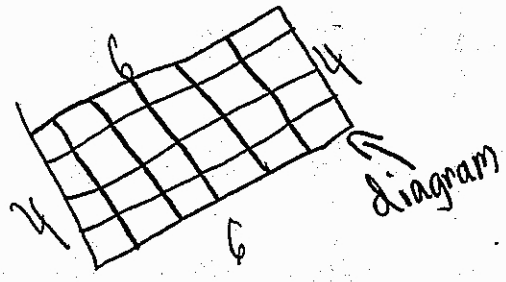
$21 \div \_7\_ = 3$

7x3=21 so 7 is the corret number in the porblem.



$6 \times \_4\_ = 24$

24÷4=6 so 4 is the corret number in the problem.



Anchor 5 Litho 00123200170

Total Content Points: 1 (3.OA.A.4)

Total Practice Points: 2 (MP3, MP4)

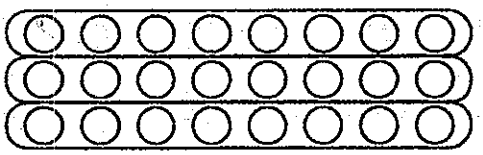
In Parts A and C, the student correctly solves the multiplication and division equations by providing the missing factors and divisors (3, 7, and 4) (3.OA.A.4). In Part B, the student constructs a valid argument why both diagrams represent the equation by disregarding the drawn circles and stating that "there are 3 rows and 8 coloms in both diagrams" (MP3). The student creates diagrams that model each equation in Part C (MP4). In Part C, the student only verifies the given answers, instead of explaining how the diagrams show the numbers in the equations through references to groups, columns and rows, or division or multiplication terminology (no credit for MP6).

Total Awarded Points: 3 out of 4

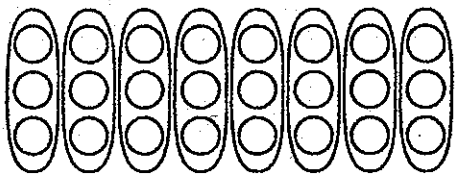
Showing Division Task

Jennifer and Levon draw diagrams to solve the equation 24 ÷ ? = 8.

Jennifer's Diagram



Levon's Diagram



Both of their diagrams are correct, but they show different ways of solving the equation.

a. Write the unknown number that makes the equation 24 ÷ ? = 8 true.

The # that makes 24÷_=8 is 3. The # is 3 because if you do 8x3 you get 24.

b. Explain in words why both diagrams show 24 ÷ ? = 8.

Because Jennifer's has 3 rows of 8 and Levon's has 8 columns of 3's.

Litho#: 00303200170

A-6b

Showing Division Task

c. Fill in the blank in each equation below with the number that makes the equation true. Make a diagram to show each equation. For each equation, explain in words how each number is shown in the diagram.

$21 \div \_\_7\_\_ = 3$	$6 \times \_\_4\_\_ = 24$

Anchor 6 Litho 00303200170

Total Content Points: 1 (3.OA.A.4)

Total Practice Points: 1 (MP3)

In Parts A and C, the student correctly solves the multiplication and division equations by providing the missing factors and divisors (3, 7, and 4) (3.OA.A.4). In Part B, the student constructs a valid argument why both diagrams represent the equation by stating that "Jennifer's has 3 rows of 8 and Levon's has 8 columns of 3's" (MP3). The student does not create diagrams to model the equations in Part C (no credit for MP4). Although the student uses precise language in Part B, no explanation is provided in Part C (no credit for MP6).

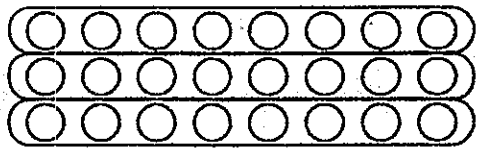
Total Awarded Points: 2 out of 4

A-7a

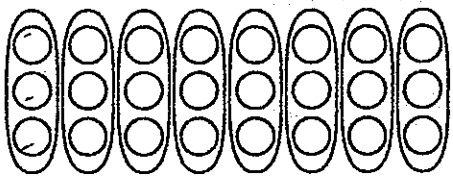
Showing Division Task

Jennifer and Levon draw diagrams to solve the equation 24 ÷ ? = 8.

Jennifer's Diagram



Levon's Diagram



Both of their diagrams are correct, but they show different ways of solving the equation.

a. Write the unknown number that makes the equation 24 ÷ ? = 8 true.

24 ÷ 3 = 8

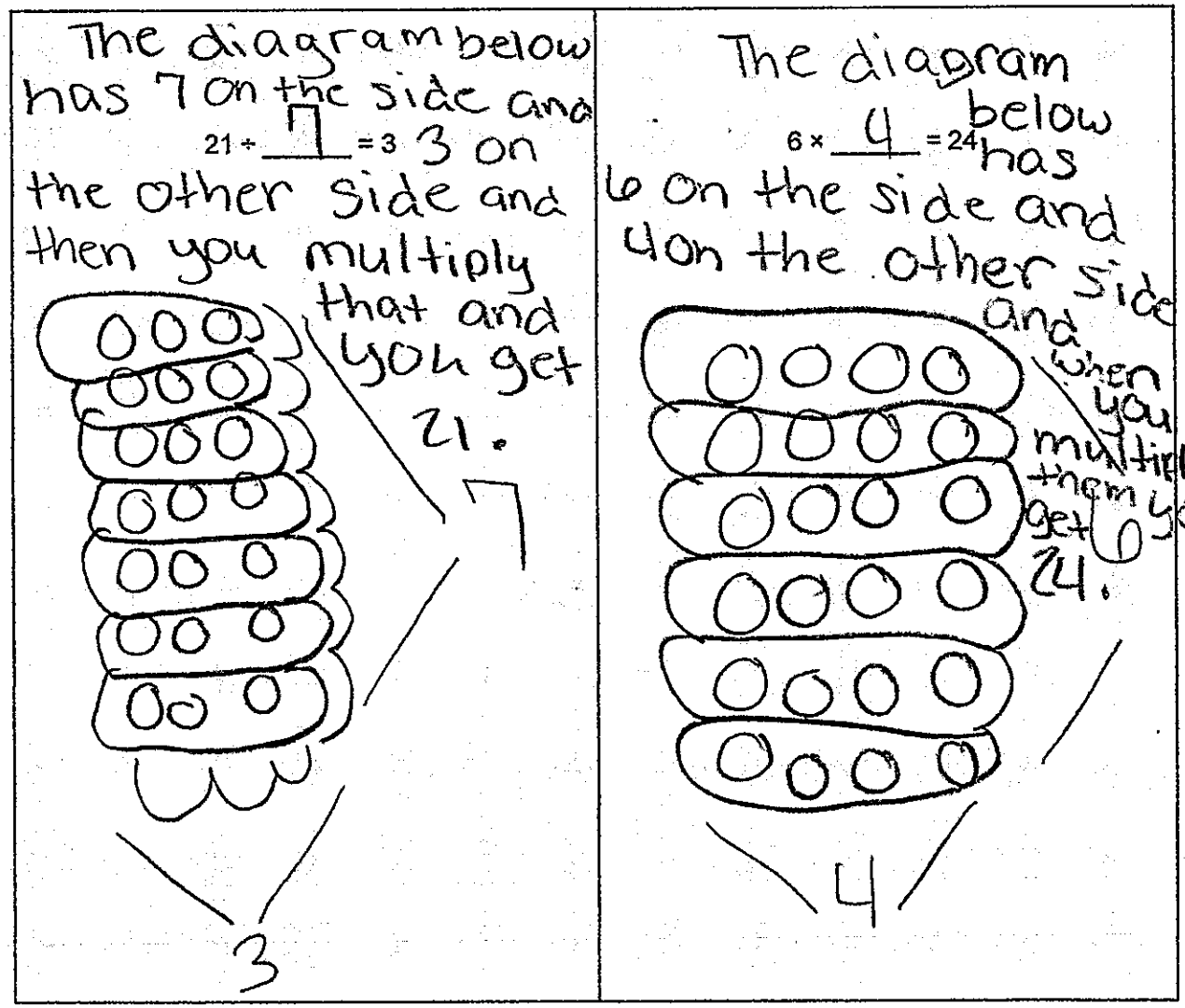
b. Explain in words why both diagrams show 24 ÷ ? = 8.

They both show 24 ÷ 3 = 8 because Jennifer's diagram has 3 and Levon's has 3.

Litho#: 00033200170

Showing Division Task

c. Fill in the blank in each equation below with the number that makes the equation true. Make a diagram to show each equation. For each equation, explain in words how each number is shown in the diagram.



Anchor 7 Litho 00033200170

Total Content Points: 1 (3.OA.A.4)

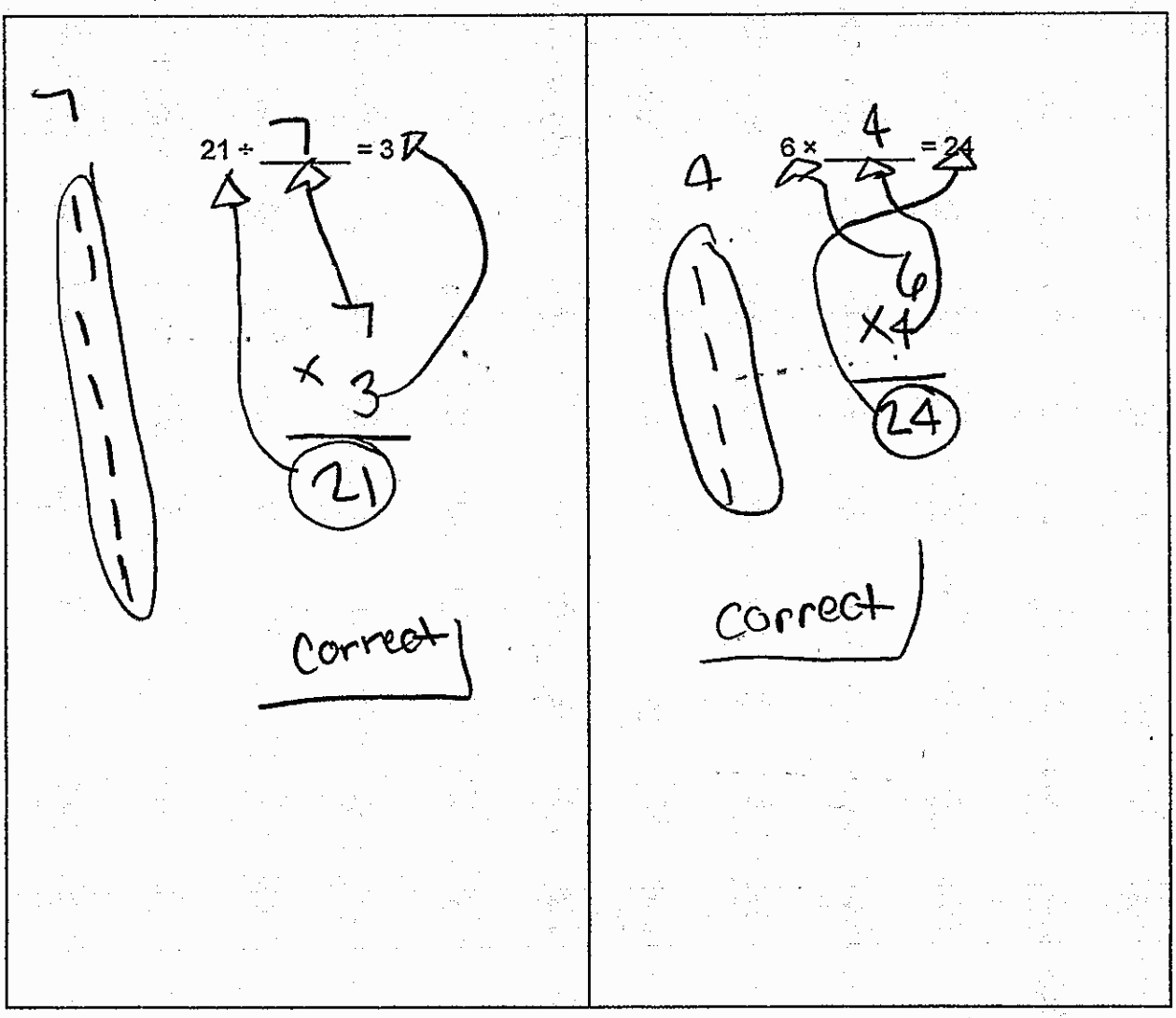
Total Practice Points: 1 (MP4)

In Parts A and C, the student correctly solves the multiplication and division equations by providing the missing factors and divisors (3, 7, and 4) (3.OA.A.4). In Part B, because there is no reference to 8, and because both references to the "3" are unclear ("because Jennifer's diagram has 3 and Levon's has 3"), the student does not construct a valid argument for why both diagrams represent the equation (no credit for MP3). The student creates diagrams that model each equation in Part C (MP4). In Part B, by not referencing the 3s as groups, columns, or rows, the student does not use precise language in the explanation, and, in Part C, the language is also imprecise ("7 on the side and 3 on the other side" and "6 on the side and 4 on the other side") (no credit for MP6).

Total Awarded Points: 2 out of 4

Showing Division Task

c. Fill in the blank in each equation below with the number that makes the equation true. Make a diagram to show each equation. For each equation, explain in words how each number is shown in the diagram.



Anchor 8 Litho 00423200170

Total Content Points: 1 (3.OA.A.4)

Total Practice Points: 1 (MP3)

In Parts A and C, the student correctly solves the multiplication and division equations by providing the missing factors and divisors (3, 7, and 4) (3.OA.A.4). In Part B, the student constructs a valid argument for why both diagrams represent the equation by stating that both diagrams "have 8 going across 3 going down, and together they equal 24" (MP3). In the first part of Part C, the student writes a multiplication equation verifying the answer to the division equation. In the second part of Part C, the student recopies the multiplication equation instead of creating diagrams that model the given equations (no credit for MP4). In Part B, by not referencing the numbers as groups, columns, or rows, the student does not use precise language in the explanation, and in Part C, no explanation is provided (no credit for MP6).

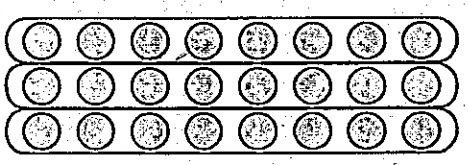
Total Awarded Points: 2 out of 4

A-9a

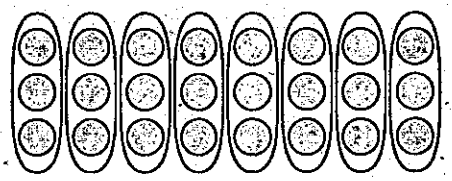
Showing Division Task

Jennifer and Levon draw diagrams to solve the equation 24 ÷ ? = 8.

Jennifer's Diagram



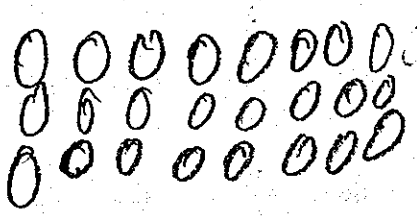
Levon's Diagram



Both of their diagrams are correct, but they show different ways of solving the equation.

a. Write the unknown number that makes the equation 24 ÷ ? = 8 true.

24 ÷ 3 = 8



b. Explain in words why both diagrams show 24 ÷ ? = 8.

They are both the same.

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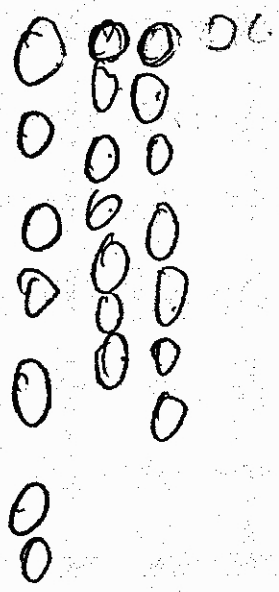
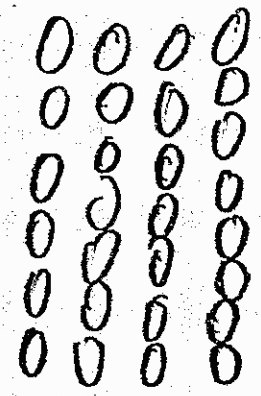
Showing Division Task

c. Fill in the blank in each equation below with the number that makes the equation true. Make a diagram to show each equation. For each equation, explain in words how each number is shown in the diagram.

$21 \div \underline{7} = 3$



$6 \times \underline{4} = 24$



Anchor 9 Litho 00303200173

Total Content Points: 1 (3.OA.A.4)

Total Practice Points: 0

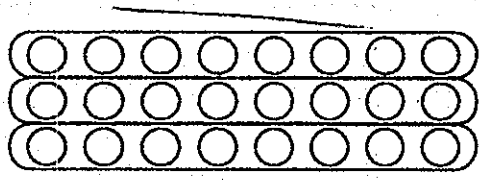
In Parts A and C, the student correctly solves the multiplication and division equations by providing the missing factors and divisors (3, 7, and 4) (3.OA.A.4). In Part B, the student does not construct a valid argument why both diagrams represent the equation, but instead simply asserts that "They are both the same" with no reasoning (no credit for MP3). The first diagram in Part C models the equation by showing three columns with seven circles in each. However, the second diagram does not accurately model the equation, since three of the four columns do not have six circles (no credit for MP4). In Part B, by referencing neither groups nor columns and rows to support the answer, the student does not use precise language; and, in Part C, no explanation is provided (no credit for MP6).

Total Awarded Points: 1 out of 4

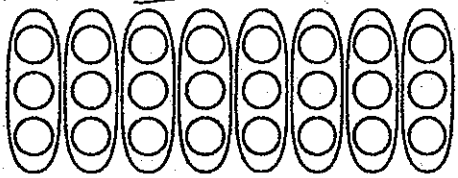
Showing Division Task

Jennifer and Levon draw diagrams to solve the equation 24 ÷ ? = 8.

Jennifer's Diagram



Levon's Diagram



Both of their diagrams are correct, but they show different ways of solving the equation.

a. Write the unknown number that makes the equation 24 ÷ ? = 8 true.

24 ÷ 3 = 8

I got my answer by asking myself what is 8 x 3 = 24. That how I got it.

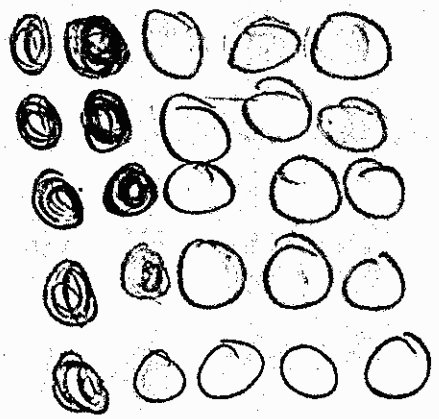
b. Explain in words why both diagrams show 24 ÷ ? = 8.

They are both right. The only thing differ is that Jennifer did her diagram in rows & colums.

Showing Division Task

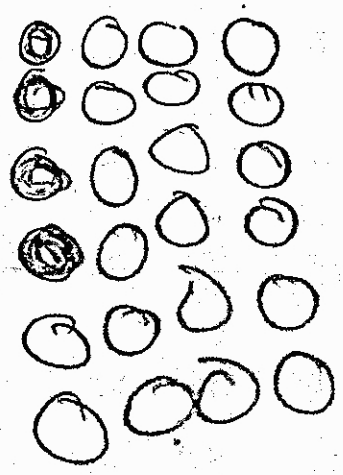
c. Fill in the blank in each equation below with the number that makes the equation true. Make a diagram to show each equation. For each equation, explain in words how each number is shown in the diagram.

$21 \div \underline{9} = 3$



I got my answer by doing 3x9=is what.

$6 \times \underline{4} = 24$



I got my answer by asking myself What is 6x4 and it is 24.

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Total Content Points: 0

Total Practice Points: 0

In Part A, the student solves the division equation by providing the missing divisor (3), and, in Part C, the student provides the missing factor for the multiplication equation (4); however, the student does not accurately solve for the missing divisor in the division equation in Part C (no credit for 3.OA.A.4). In Part B, by disregarding the relevant numbers 3 and 8 and only discussing rows and columns, the student does not construct a valid argument why both diagrams represent the equation (no credit for MP3). The student creates a 4 by 6 diagram in Part C that accurately represents the multiplication equation, but the 5 by 5 diagram for the division equation is inaccurate (no credit for MP4). In Part C, by not referencing groups, columns and rows, or division or multiplication terminology, and by only restating the equations, the student does not adequately explain the answers (no credit for MP6).

Total Awarded Points: 0 out of 4

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