Tennessee Comprehensive Assessment Program

TCAP/CRA 2013

5

Task 3 Scoring Guide

Reading a Book Task

Task 3. Reading a Book Task

Tito has to read a 40-page book for school. Tito wants to read $\frac{2}{5}$ of the book every night. Tito claims that he can find $\frac{2}{5} \times 40$ in two different ways:

He can divide 40 by 5 and multiply by 2.
OR
He can multiply 2 by 40 and divide by 5.

a. Use diagrams to prove that Tito can use either way.

b. Use one of Tito's methods to find $\frac{2}{7} \times 35$.

3. Reading a Book Task Scoring Guide

The CCSS for Mathematical Content (2 points)

5.NF.B.4a Uses Tito's method to show multiplication of a fraction $\frac{a}{b}$ by a whole number q as a parts of a partition of q into b equal parts, or as the result of a sequence of operations $a \times q \div b$. The student may show: _____

- Dividing 40 by 5 and multiplying the quotient by 2;
- Dividing 35 by 7 and multiplying the quotient by 2;
- Multiplying 40 by 2 and dividing the product by 5;
- Multiplying 35 by 2 and dividing the product by 7.

(1 Point)

5.NF.B.4 Indicates that the product of $\frac{2}{7} \times 35$ is 10. _____

(1 Point)

Total Content Points _____

The CCSS for Mathematical Practice (1 point)

MP4 Uses diagrams to model at least one of the following: _____

- $\frac{2}{5} \times 40$
- $\frac{2}{7} \times 35$
- $40 \div 5 \times 2$
- $2 \times 40 \div 5$
- $35 \div 7 \times 2$
- $2 \times 35 \div 7$

(1 Point)

(MP4: Model with mathematics.)

Total Practice Points _____

Total Awarded Points _____

The CCSS for Mathematical Content Addressed in This Task

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

5.NF.B.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.

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

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 text indicates Mathematical Practices that are not addressed in this task.

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

Task 3. Reading a Book Task

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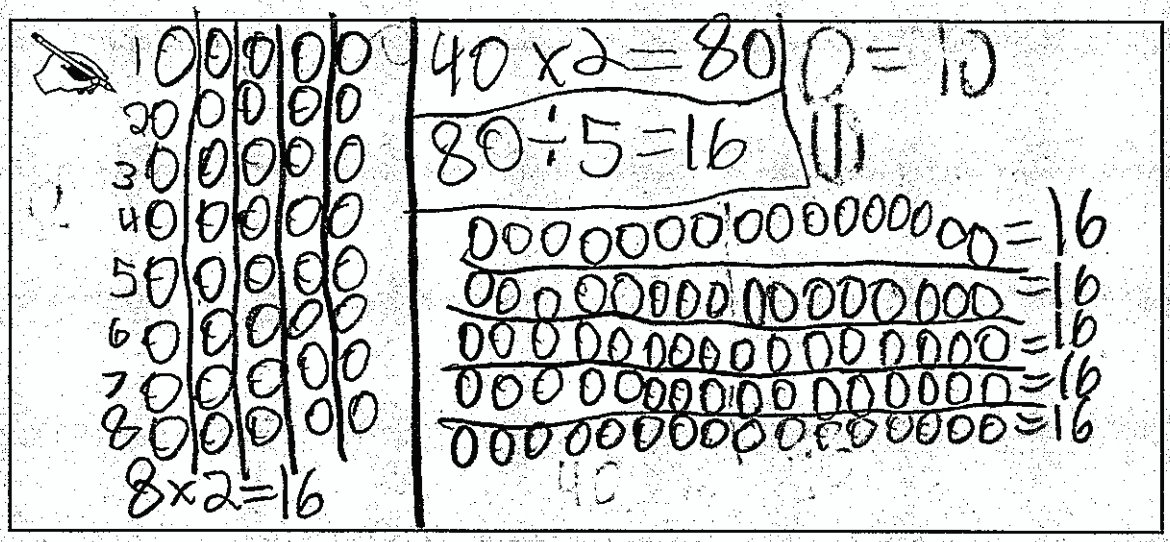
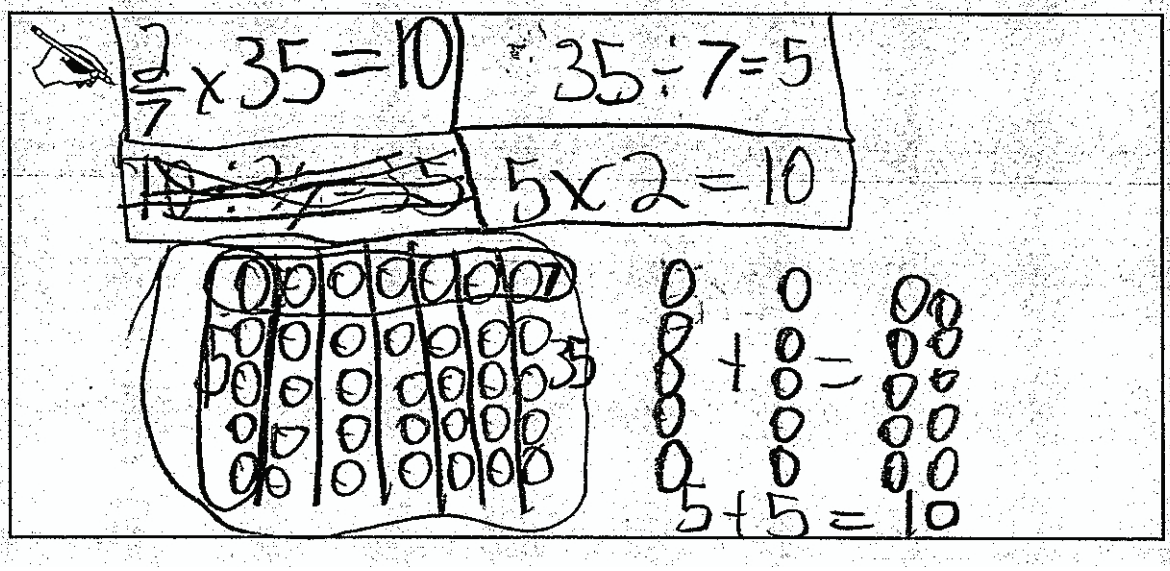
He can divide 40 by 5 and multiply by 2.
OR
He can multiply 2 by 40 and divide by 5.

a. Use diagrams to prove that Tito can use either way.



b. Use one of Tito's methods to find $\frac{2}{7} \times 35$.



Litho#: 559303

Anchor 1 Litho 559303

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

Total Practice Points: 1 (MP4)

In Part A, the student uses Tito's methods to show multiplication of a fraction $\frac{a}{b}$ by a whole number q by using a sequence of operations ($40 \times 2 = 80$, $80 \div 5 = 16$) (5.NF.B.4a). In Part B, the student applies and extends previous understandings of multiplication to multiply a fraction by a whole number $\left(\frac{2}{7} \times 35\right)$ and indicates that the product is 10 (5.NF.B.4). In Part A, the student models the equation $80 \div 5 = 16$ with an accurate diagram by showing 80 circles divided into 5 rows, each row containing 16 circles (MP4).

Total Awarded Points: 3 out of 3

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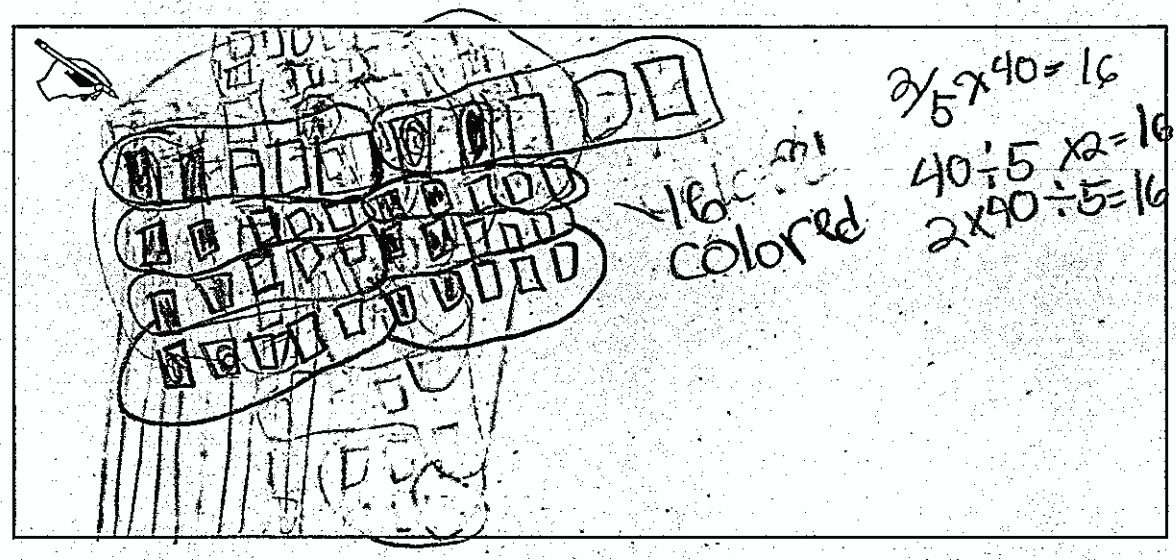
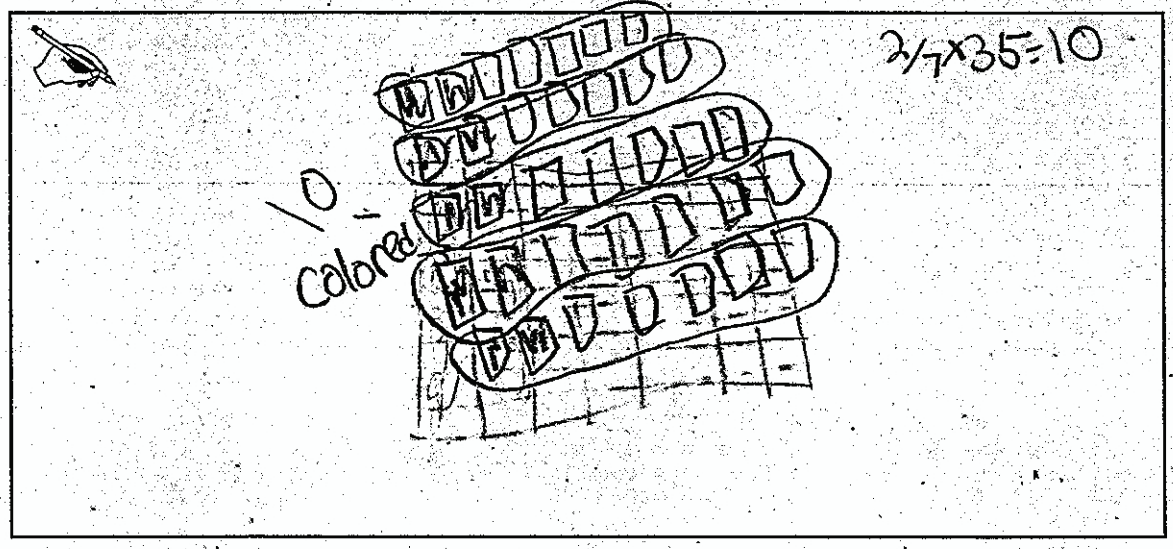


b. Use one of Tito's methods to find $\frac{2}{7} \times 35$.



Litho#: 559401

Anchor 2 Litho 559401

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

Total Practice Points: 1 (MP4)

In Part A, the student uses both of Tito's methods to show multiplication of a fraction $\frac{a}{b}$ by a whole number q. The student does this by partitioning 40 into 5 equal parts, and then multiplying by 2 ($40 \div 5 \times 2 = 16$), as well as by a sequence of operations ($2 \times 40 \div 5 = 16$) (5.NF.B.4a). In Part B, the student applies and extends previous understandings of multiplication to multiply a fraction by a whole number $\left(\frac{2}{7} \times 35\right)$, and indicates that the product is 10 (5.NF.B.4). By showing a diagram containing 5 rows of 7 and having 2 units in each row shaded, the student accurately models this equation (MP4).

Total Awarded Points: 3 out of 3

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OR
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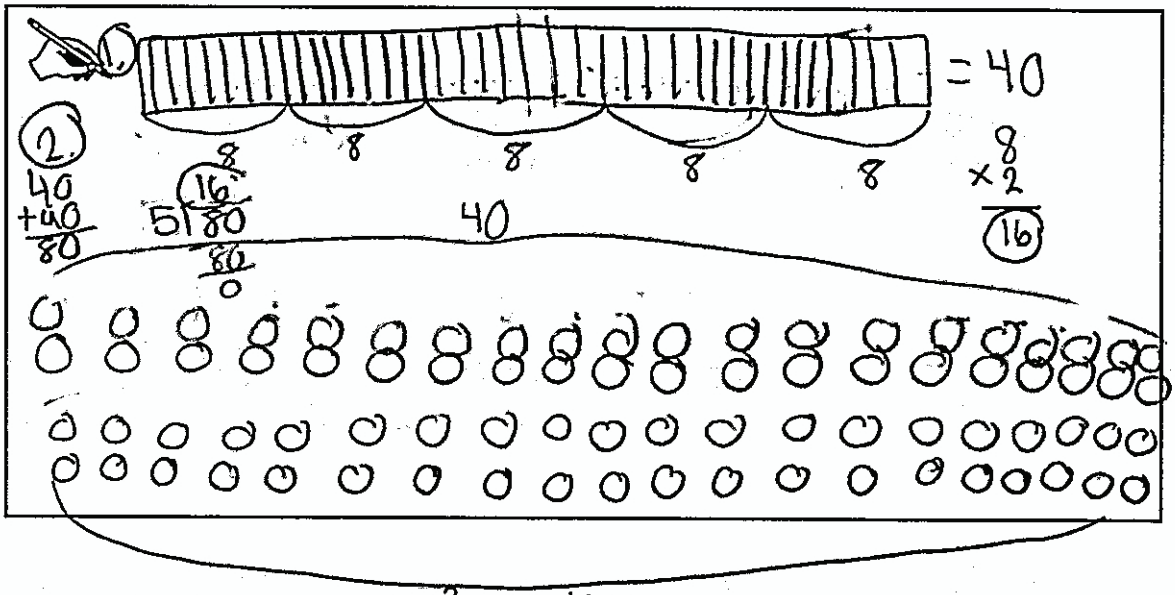
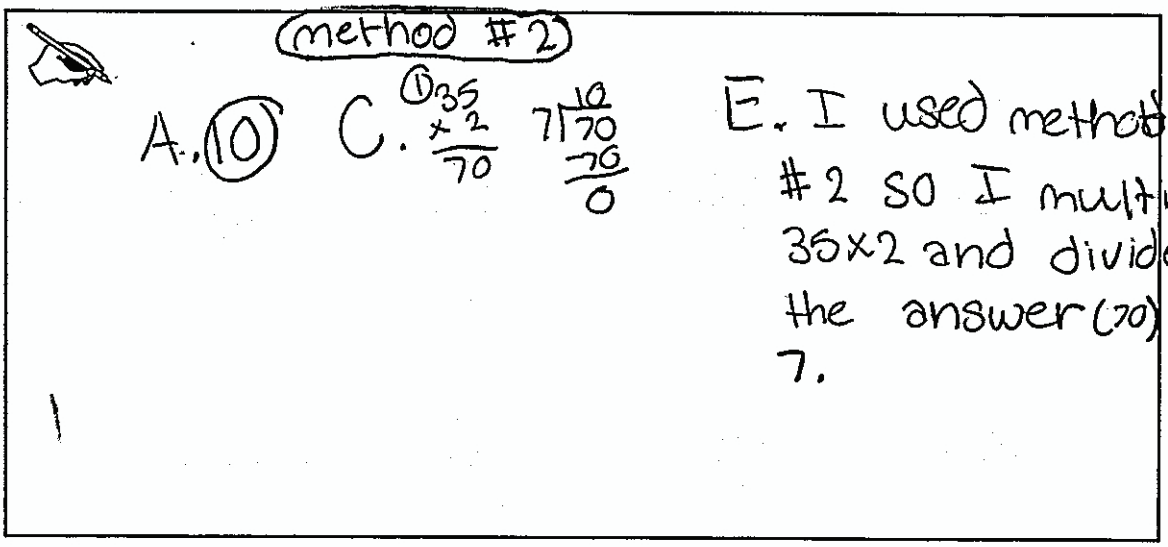
a. Use diagrams to prove that Tito can use either way.



b. Use one of Tito's methods to find $\frac{2}{7} \times 35$. 40



Anchor 3 Litho 559649

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

Total Practice Points: 1 (MP4)

In Part A, by using a sequence of operations (40 × 2 = 80, 80 ÷ 5 = 16), the student uses both of Tito's methods to show multiplication of a fraction $\frac{a}{b}$ by a whole number q (5.NF.B.4a). In Part B, the student applies and extends previous understandings of multiplication (2 × 35 = 70, then 70 ÷ 7 = 10) to calculate the answer 10 (5.NF.B.4). The student models the situation in Part A by providing a diagram that partitions a rectangle of 40 smaller rectangles into 5 equal groups of 8, and indicating that 2 of these are equal to 16 (MP4).

Total Awarded Points: 3 out of 3

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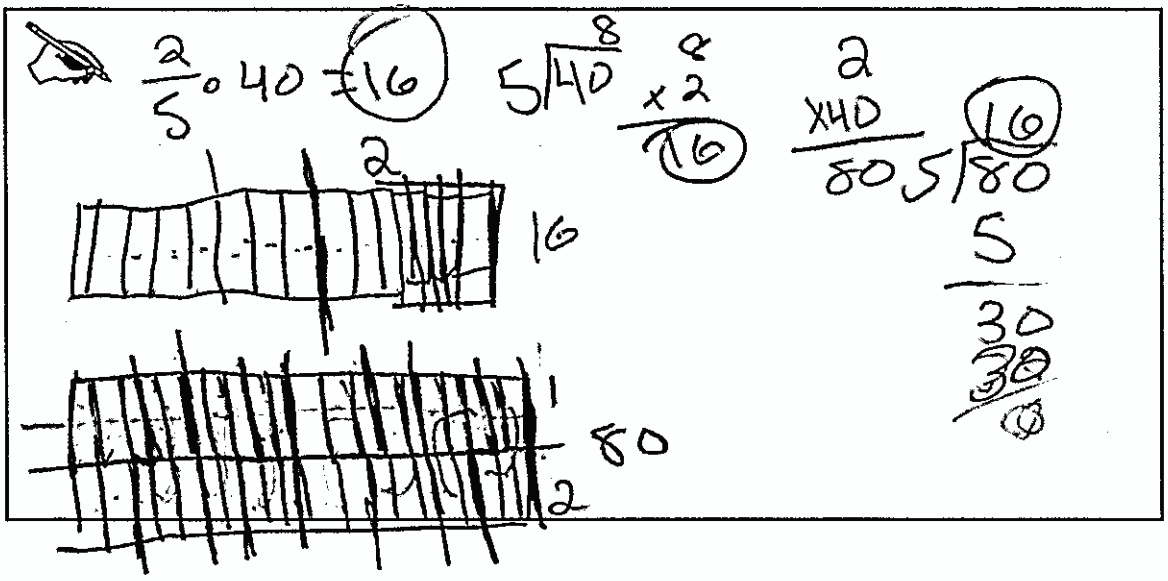
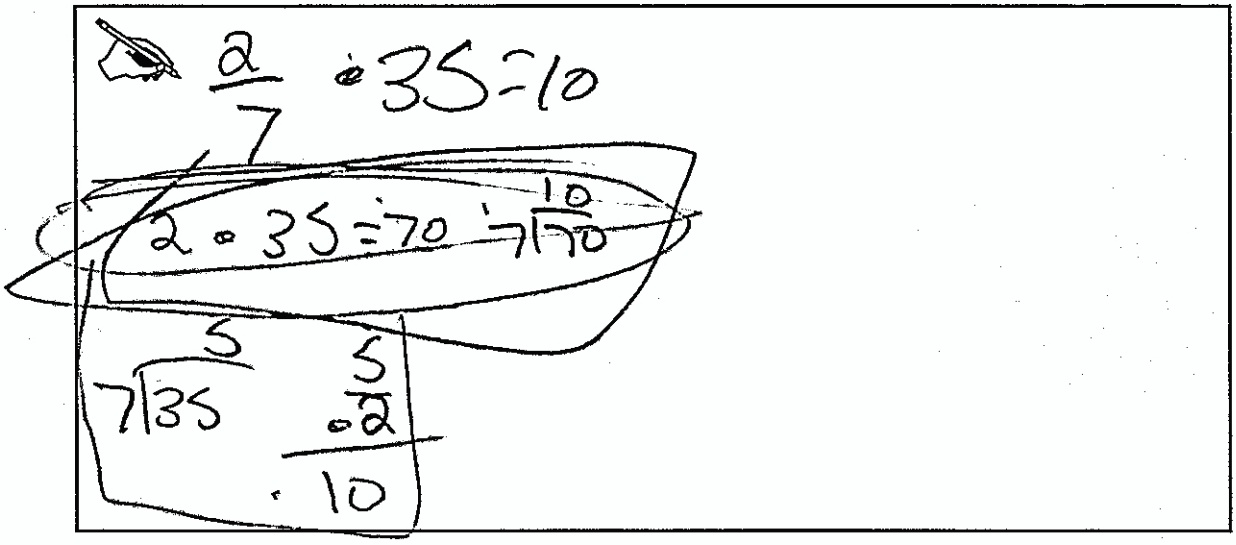


b. Use one of Tito's methods to find $\frac{2}{7} \times 35$.



Litho#: 554351

Anchor 4 Litho 554351

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

Total Practice Points: 0

In Part A, by using a sequence of operations ($2 \times 40 = 80$, $80 \div 5 = 16$) and by partitioning q into b equal parts ($40 \div 5 = 8$) and taking a parts of that ($8 \times 2 = 16$), the student uses both of Tito's methods to show multiplication of a fraction $\frac{a}{b}$ by a whole number q (5.NF.B.4a). In Part B, the student applies and extends previous understandings of multiplication by using one of Tito's methods to indicate a correct answer ($2 \times 35 = 70$, $70 \div 7 = 10$) (5.NF.B.4). The diagrams the student provides do not model the equation in Part A accurately (no credit for MP4).

Total Awarded Points: 2 out of 3

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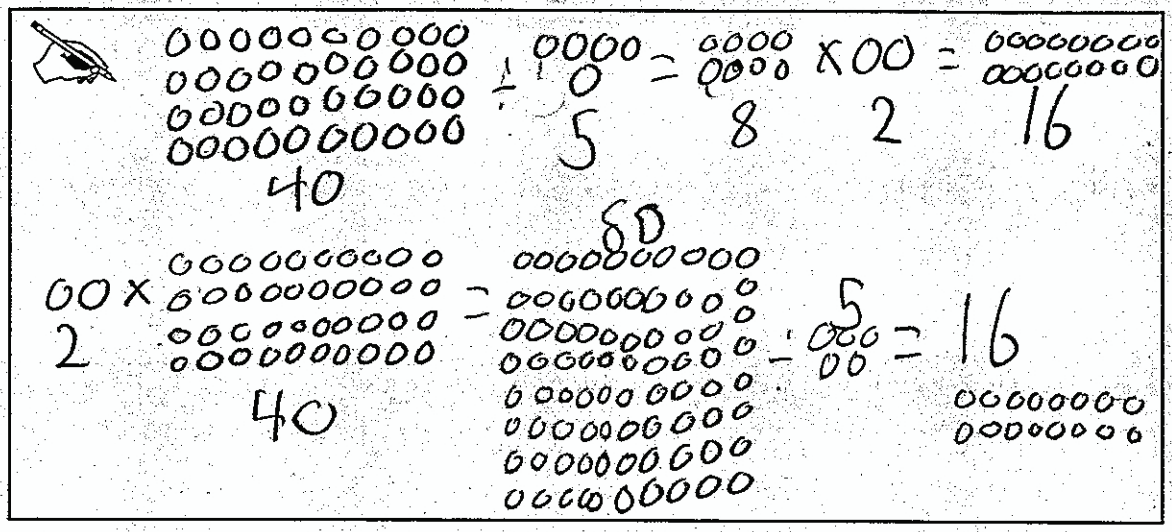

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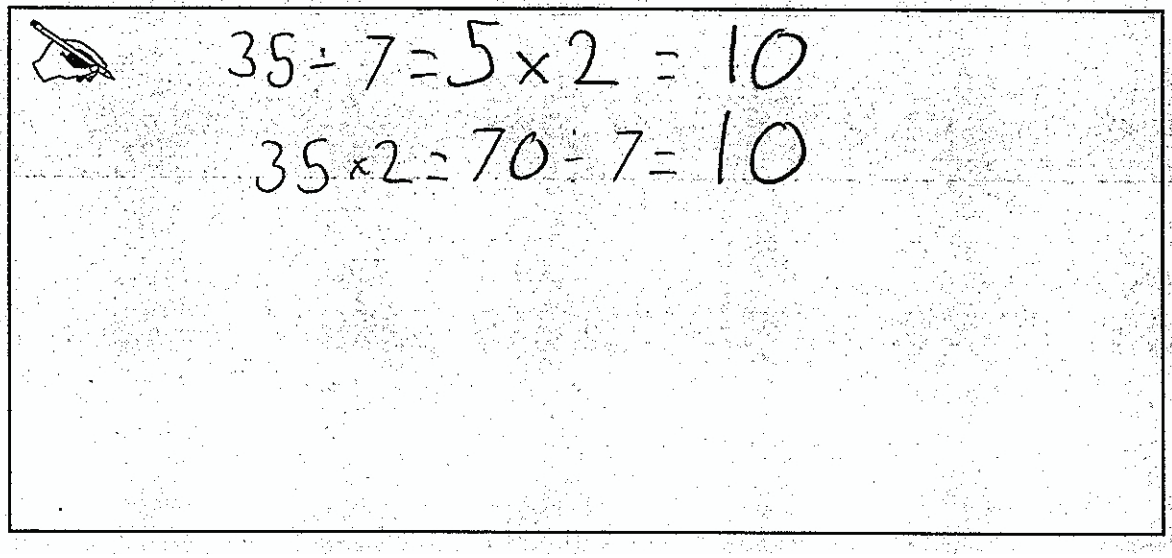

Litho#: 585493

Anchor 5 Litho 585493

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

Total Practice Points: 0

The student uses both of Tito's methods in Part B to show multiplication by using a sequence of operations ($35 \div 7 = 5$, $5 \times 2 = 10$) (5.NF.B.4a). This use of both methods to indicate that the product is 10 shows the student applies and extends an understanding of multiplication (5.NF.B.4). In Part A, the student provides only representations of the numbers in the equation, and does not create an acceptable diagram (no credit for MP4).

Total Awarded Points: 2 out of 3

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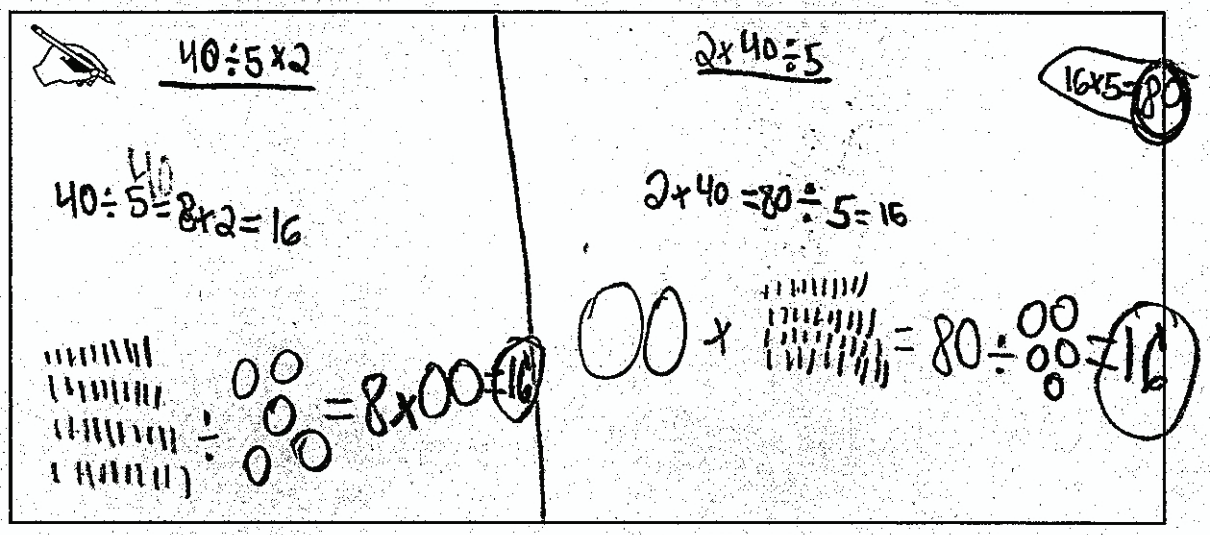
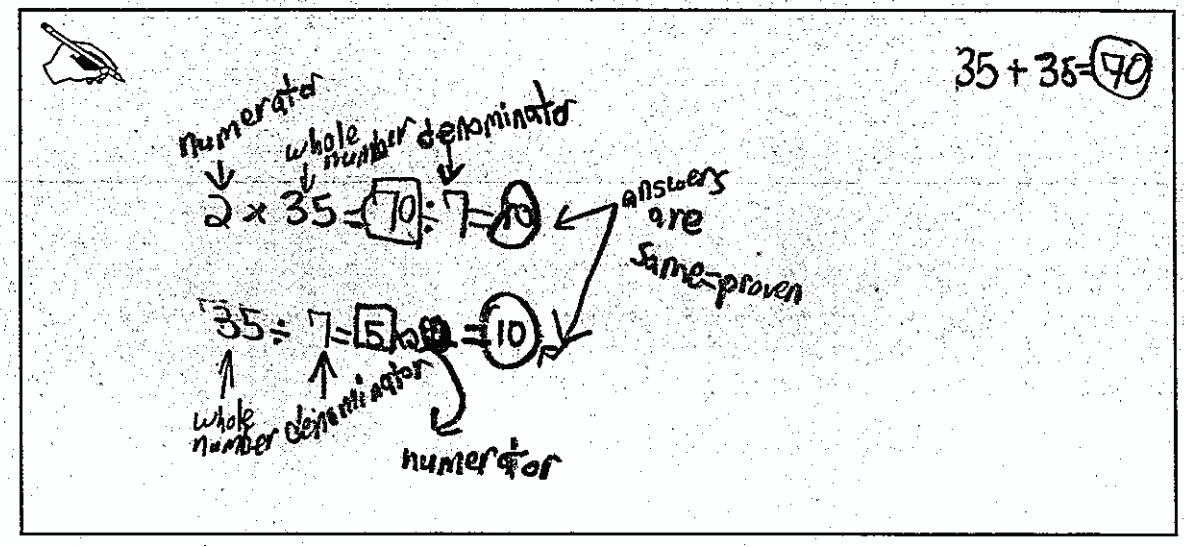


b. Use one of Tito's methods to find $\frac{2}{7} \times 35$.



Litho#: 567832

Anchor 6 Litho 567832

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

Total Practice Points: 0

In Part A, the student uses both of Tito's methods to show multiplication of a fraction $\frac{a}{b}$ by a whole number q by using a sequence of operations ($2 \times 40 = 80$, $80 \div 5 = 16$) (5.NF.A4a). In Part B, the student uses one of Tito's methods ($2 \times 35 = 70$, $70 \div 7 = 10$) to indicate the correct answer, thus applying and extending previous understandings of multiplication (5.NF.B.4). The student provides only representations of the numbers in the equation in Part A and does not create an acceptable diagram (no credit for MP4).

Total Awarded Points: 2 out of 3

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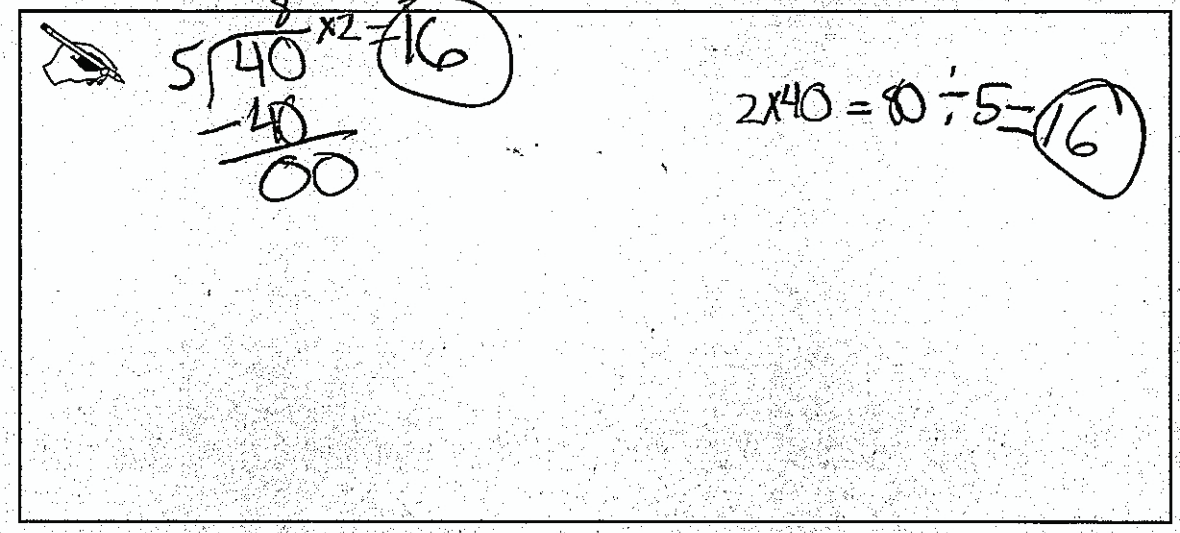

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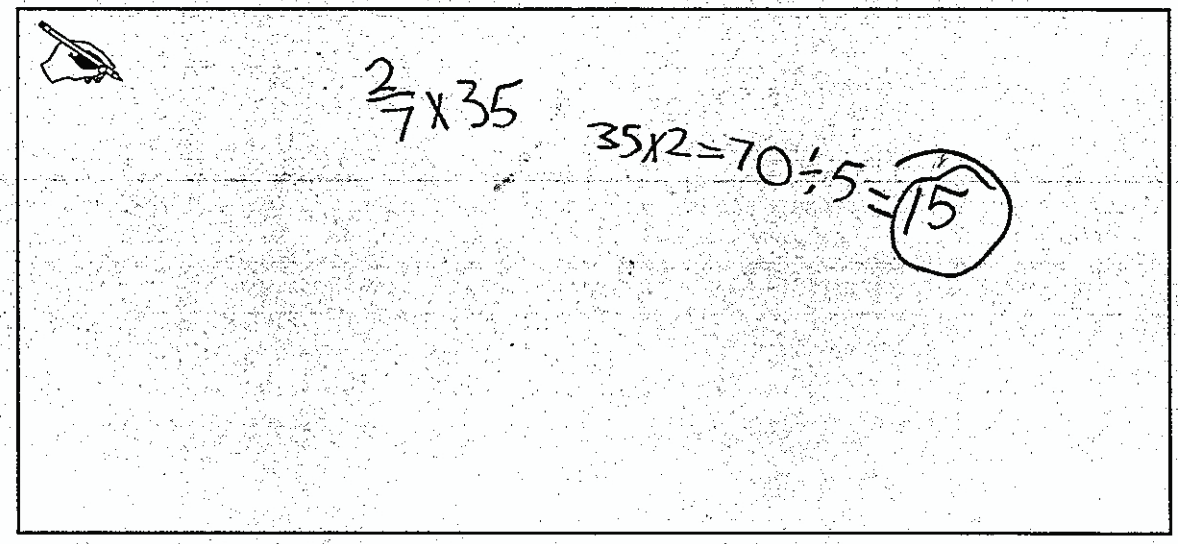

Anchor 7 Litho 579139

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

Total Practice Points: 0

In Part A, the student uses Tito's methods to show multiplication of a fraction $\frac{a}{b}$ by a whole number q by using a sequence of operations (40 ÷ 5 = 8, 8 x 2 = 16), and then uses a different sequence of operations to determine the product again (2 x 40 = 80, 80 ÷ 5 = 16) (5.NF.B.4a). In Part B, the student does not find the correct product of $\frac{2}{7} \times 35$ (no credit for 5.NF.B.4). No diagrams are provided to model any of the equations (no credit for MP4).

Total Awarded Points: 1 out of 3

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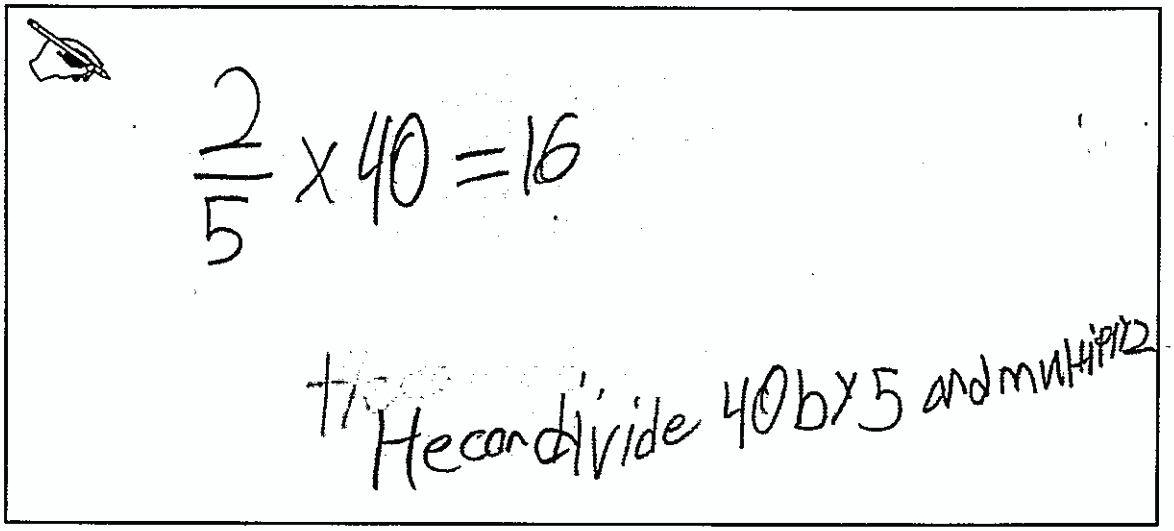
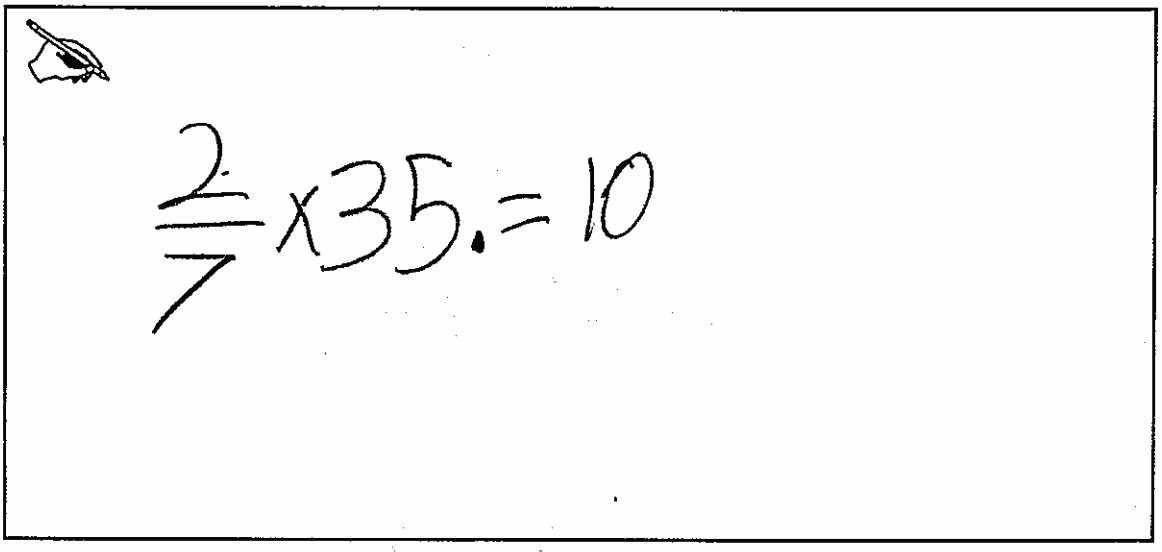


b. Use one of Tito's methods to find $\frac{2}{7} \times 35$.



Litho#: 580826

Anchor 8 Litho 580826

Total Content Points: 1 (5.FN.A.4)

Total Practice Points: 0

In Part A, the student does not use Tito's method to show multiplication (no credit for 5.NF.B.4a). The student indicates that the answer is 10 for Part B (5.NF.B.4). The student provides no diagrams in the response (no credit for MP4).

Total Awarded Points: 1 out of 3

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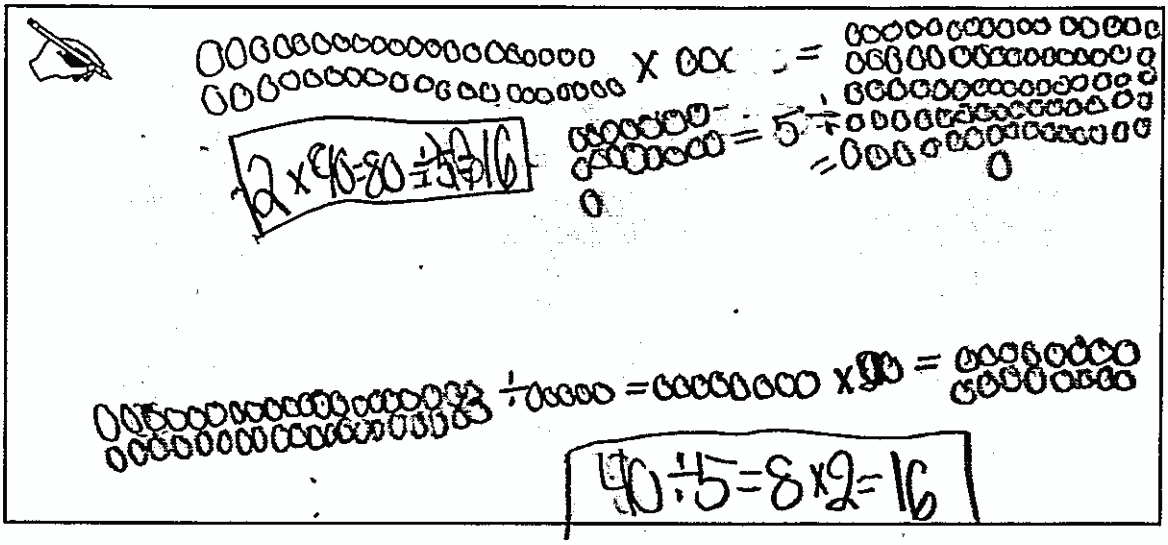
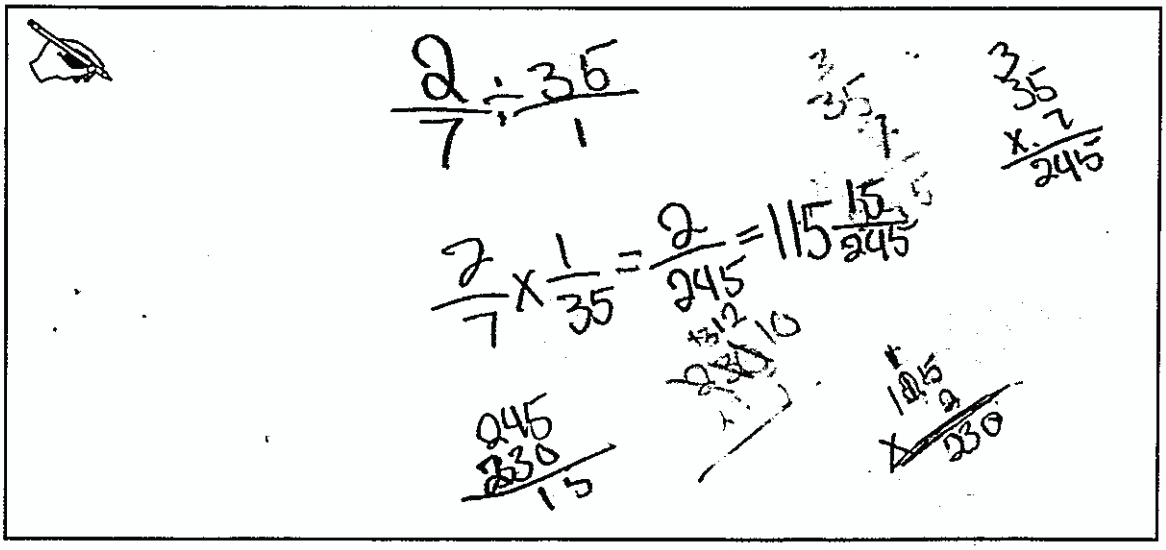


b. Use one of Tito's methods to find $\frac{2}{7} \times 35$.



Litho#: 577025

Anchor 9 Litho 577025

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

Total Practice Points: 0

In Part A, by using sequences of operations ($2 \times 40 = 80$, $80 \div 5 = 16$ and $40 \div 5 = 8$, $8 \times 2 = 16$), the student uses Tito's methods to show multiplication of a fraction $\frac{a}{b}$ by a whole number q (5.NF.B.4a). In Part B, the student does not apply or extend previous understandings of multiplication to multiply a fraction by a whole number, and does not indicate the product of $\frac{2}{7} \times 35$ is 10 (no credit for 5.NF.B.4). The student does not model any of the possible equations with a diagram (no credit for MP4).

Total Awarded Points: 1 out of 3

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OR
He can multiply 2 by 40 and divide by 5.

a. Use diagrams to prove that Tito can use either way.

$\frac{2}{5} \times 40 = 16$

$40 \div 5 \times 2 = 16$

$2 \times 40 \div 5 = 16$

b. Use one of Tito's methods to find $\frac{2}{7} \times 35$.

$2 \times 40 \div 8 = 10$

Anchor 10 Litho 568920

Total Content Points: 0

Total Practice Points: 0

In Part A, the student does not clearly demonstrate using either of Tito's methods. Not indicating with parentheses the sequence of operations and not providing diagrams makes the equations provided unacceptable (no credit for 5.NF.B.4a). In Part B, the student does not use the correct equation $\left(\frac{2}{7} \times 35\right)$ to indicate the product 10 (no credit for 5.NF.B.4). The student does not include a diagram in the response (no credit for MP4).

Total Awarded Points: 0 out of 3