

Tennessee Comprehensive Assessment Program

TCAP/CRA 2013



4

Task 4 Scoring Guide

Bill's Claim Task

4. Bill's Claim Task Scoring Guide

The CCSS for Mathematical Content (1 point)

4.NF.B.4b Indicates an understanding that $3 \times \frac{2}{5}$ is equal to $6 \times \frac{1}{5}$. Student may: _____

- indicate the relationship between a group of $\frac{2}{5}$ and 2 of the fifths from $6 \times \frac{1}{5}$ and indicate that the product of $3 \times \frac{2}{5}$ and $6 \times \frac{1}{5}$ is the same in each diagram.
- represent 2 diagrams, one illustrating $3 \times \frac{2}{5}$ and one representing $6 \times \frac{1}{5}$ and indicating that both represent $\frac{6}{5}$.

(1 Point)

Total Content Points _____

The CCSS for Mathematical Practice (1 point)

MP3 Provides a reasonable explanation showing that the two expressions are equivalent. _____

(1 Point)

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

Total Practice Points _____

Total Awarded Points _____

The CCSS for Mathematical Content Addressed in This Task

Build fractions from unit fractions by applying and extending previous understanding of operations on whole numbers.

4.NF.B.4b Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general, $n \times (a/b) = (n \times a)/b$.)*

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 4. Bill's Claim Task

Bill claims that the expressions $3 \times \frac{2}{5}$ and $6 \times \frac{1}{5}$ are equivalent.

Draw and label diagrams and give a written explanation to show that the two expressions are equivalent.

The diagram is enclosed in a hand-drawn rectangular border. In the top-left corner, there is a small drawing of a hand holding a pencil. Below this, there are two boxes, each containing the fraction $\frac{2}{5}$. To the left of a third box containing $\frac{2}{5}$, the equation $3 \times \frac{2}{5} = 1 \frac{1}{5}$ is written. A horizontal line separates this section from the next. Below the line, there are two rows of boxes. The first row contains three boxes, each with $\frac{1}{5}$. The second row also contains three boxes, each with $\frac{1}{5}$. Another horizontal line is drawn below these rows. Below the second line, the equation $= 1 \frac{1}{5}$ is written. At the bottom of the diagram, there is a handwritten explanation: "yes the two are equivalent because 3 is half of 6 so $\frac{1}{5}$ is half of $\frac{2}{5}$."

Anchor 1 Litho 479732

Total Content Points: 1 (4.NF.B.4b)

Total Practice Points: 1 (MP3)

The student indicates an understanding that $3 \times \frac{2}{5}$ is equal to $6 \times \frac{1}{5}$ by drawing two diagrams, with one illustrating $3 \times \frac{2}{5}$ and one representing $6 \times \frac{1}{5}$, and indicating that both represent $1\frac{1}{5}$ (4.NF.B.4b). The student provides a reasonable explanation showing that the 2 expressions are equivalent (“the two are equivalent Because 3 is half of 6 so $\frac{1}{5}$ is half of $\frac{2}{5}$ ”) (MP3).

Total Awarded Points: 2 out of 2

Task 4. Bill's Claim Task

Bill claims that the expressions $3 \times \frac{2}{5}$ and $6 \times \frac{1}{5}$ are equivalent.

Draw and label diagrams and give a written explanation to show that the two expressions are equivalent.

Bill is right. $\frac{2}{5} + \frac{2}{5} + \frac{2}{5} = \frac{6}{5}$ (or $1\frac{1}{5}$), and

$\frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} = \frac{6}{5}$ (or $1\frac{1}{5}$). $\frac{6}{5} = \frac{6}{5}$ or $1\frac{1}{5} = 1\frac{1}{5}$

Anchor 2

Litho 481000

Total Content Points: 1 (4.NF.B.4b)

Total Practice Points: 1 (MP3)

The student indicates an understanding that $3 \times \frac{2}{5}$ is equal to $6 \times \frac{1}{5}$ by constructing two diagrams, one illustrating $\frac{2}{5} + \frac{2}{5} + \frac{2}{5} = 1\frac{1}{5}$, and one illustrating $\frac{1}{5}$ added 6 times equals $\frac{6}{5}$, which equals $1\frac{1}{5}$ (4.NF.B.4b). The student provides a reasonable explanation that the two expressions

$\left(\frac{2}{5} + \frac{2}{5} + \frac{2}{5} \text{ and } \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5}\right)$ are equivalent by having the same solution, $\frac{6}{5}$ (or $1\frac{1}{5}$) (MP3).

Total Awarded Points: 2 out of 2

Task 4. Bill's Claim Task

Bill claims that the expressions $3 \times \frac{2}{5}$ and $6 \times \frac{1}{5}$ are equivalent.

Draw and label diagrams and give a written explanation to show that the two expressions are equivalent.

$3 \times \frac{2}{5} = \frac{6}{5} = 1\frac{1}{5}$

$6 \times \frac{1}{5} = \frac{6}{5} = 1\frac{1}{5}$

$\frac{6}{5} + \frac{1}{5} = \frac{6}{5} = 1\frac{1}{5}$

$\frac{6}{5} + \frac{1}{5} = \frac{6}{5} = 1\frac{1}{5}$

You can see that the diagrams have the same number of parts, so they are equivalent.

Anchor 3

Litho 451276

Total Content Points: 1 (4.NF.B.4b)

Total Practice Points: 1 (MP3)


The student indicates an understanding that $3 \times \frac{2}{5}$ is equal to $6 \times \frac{1}{5}$ by indicating both the relationship between a group of $\frac{2}{5}$ and 2 of the fifths from $6 \times \frac{1}{5}$, and that the product $\frac{6}{5} = 1\frac{1}{5}$ is the same in each diagram. The two diagrams also illustrate that $3 \times \frac{2}{5}$ and $6 \times \frac{1}{5}$ both represent $\frac{6}{5}$ (4.NF.B.4b). The student provides a clear and reasonable explanation (“the diagrams have the same number of fifths. So they are equivalent”) (MP3).

Total Awarded Points: 2 out of 2

Task 4. Bill's Claim Task

Bill claims that the expressions $3 \times \frac{2}{5}$ and $6 \times \frac{1}{5}$ are equivalent.

Draw and label diagrams and give a written explanation to show that the two expressions are equivalent.



$$3 \times \frac{2}{5}$$

1	$\frac{2}{5}$
2	$\frac{2}{5}$
3	$\frac{2}{5}$

$$\frac{6}{5}$$

$$\frac{6}{5} = \frac{6}{5}$$

$$6 \times \frac{1}{5}$$

1	$\frac{1}{5}$
2	$\frac{1}{5}$
3	$\frac{1}{5}$
4	$\frac{1}{5}$
5	$\frac{1}{5}$
6	$\frac{1}{5}$

$$\frac{6}{5}$$

The denominates stay the same because that is the total number.

Both the expressions are the same because you are only supposed to multiply the whole number by the numerator, so when you multiply 3 times 2 you get 6 but the denominator stays the same. When you multiply 6 times 1 you get 6 and the denominator stays the same, so when you do all that

Anchor 4 Litho 481675

Total Content Points: 1 (4.NF.B.4b)

Total Practice Points: 1 (MP3)


The student indicates an understanding that $3 \times \frac{2}{5}$ is equal to $6 \times \frac{1}{5}$ by providing two diagrams, one illustrating 3 groups of $\frac{2}{5}$ and the other 6 groups of $\frac{1}{5}$, and indicating that they both represent $\frac{6}{5}$ (4.NF.B.4b). The student provides a reasonable explanation showing the two expressions are equivalent (“becuase you are only supposed to multiply the whole number by the numerator. When you multiply 3 times 2 you get 6 but the denomanator stays the same. When you multiply 6 times 1 you get 6 and the denomantor stays the same”) (MP3).

Total Awarded Points: 2 out of 2

Task 4. Bill's Claim Task

Bill claims that the expressions $3 \times \frac{2}{5}$ and $6 \times \frac{1}{5}$ are equivalent.

Draw and label diagrams and give a written explanation to show that the two expressions are equivalent.

	$\frac{1}{5}$	They are equivalent because, 3 is half of 6, $\frac{1}{5}$ is half $\frac{2}{5}$. Take $3 \times \frac{2}{5}$ cut $\frac{2}{5}$ in half, but double 3 you'll get $6 \times \frac{1}{5}$. They are the very same thing.
	$\frac{1}{5}$	
$\frac{2}{5}$	$\frac{1}{5}$	
$\frac{2}{5}$	$\frac{1}{5}$	
$\frac{2}{5}$	$\frac{1}{5}$	
$+\frac{2}{5}$	$+\frac{1}{5}$	
$\frac{6}{5}$	$\frac{6}{5}$	

Anchor 5

Litho 479396

Total Content Points: 0

Total Practice Points: 1 (MP3)

The student attempts to model that $3 \times \frac{2}{5}$ is equal to $6 \times \frac{1}{5}$, but the material provided is insufficient. The student does not provide diagrams that indicate a relationship between $\frac{2}{5}$ and $\frac{1}{5}$, nor are diagrams provided to indicate both expressions represent $\frac{6}{5}$; instead the student adds the numbers (no credit for 4.NF.B.4b). The student does provide a reasonable explanation showing that the two expressions are equivalent (“Take $3 \times \frac{2}{5}$ cut $\frac{2}{5}$ in half, but double 3 you’ll get $6 \times \frac{1}{5}$. They are the very same thing”) (MP3).

Total Awarded Points: 1 out of 2

Task 4. Bill's Claim Task

Bill claims that the expressions $3 \times \frac{2}{5}$ and $6 \times \frac{1}{5}$ are equivalent.

Draw and label diagrams and give a written explanation to show that the two expressions are equivalent.

Handwritten work showing the equivalence of $3 \times \frac{2}{5}$ and $6 \times \frac{1}{5}$.

Top diagram: $\frac{3}{1} \times \frac{2}{5} = \frac{6}{5}$. The numerator 3 is written above a horizontal line, and the denominator 1 is below it. To the right, the fraction $\frac{2}{5}$ is written, with two shaded circles above the 2. An equals sign follows, and the fraction $\frac{6}{5}$ is written.

Middle diagram: $\frac{6}{1} \times \frac{1}{5} = \frac{6}{5}$. The fraction $\frac{6}{1}$ is written, followed by $\times \frac{1}{5}$, an equals sign, and the fraction $\frac{6}{5}$.

Bottom diagrams: Two arrays of circles. The left array is labeled $3 \times \frac{2}{5}$ and $\frac{6}{5}$. It shows a box containing 6 shaded circles (arranged in 3 rows of 2) and 9 white circles (arranged in 3 rows of 3). The right array is labeled $6 \times \frac{1}{5}$ and $\frac{6}{5}$. It shows a box containing 6 shaded circles (arranged in 6 rows of 1) and 9 white circles (arranged in 3 rows of 3). Arrows point from the boxes to the fraction $\frac{6}{5}$ written below them.

Anchor 6

Litho 452364

Total Content Points: 1 (4.NF.B.4b)

Total Practice Points: 0

The student indicates an understanding that $3 \times \frac{2}{5}$ is equal to $6 \times \frac{1}{5}$ by drawing two diagrams, one illustrating 3 groups of $\frac{2}{5}$ and one representing 6 groups of $\frac{1}{5}$, and indicating that both represent $\frac{6}{5}$ (4.NF.B.4b). The student does not provide any explanation showing that the two expressions are equivalent (no credit for MP3).

Total Awarded Points: 1 out of 2

Task 4. Bill's Claim Task

Bill claims that the expressions $3 \times \frac{2}{5}$ and $6 \times \frac{1}{5}$ are equivalent.

Draw and label diagrams and give a written explanation to show that the two expressions are equivalent.

The diagram shows two columns of rectangular bars, each divided into five equal sections. The left column has three bars, with the first two sections of each bar shaded. Above this column is the equation $3 \times \frac{2}{5} = \frac{6}{5}$. The right column has six bars, with the first section of each bar shaded. Above this column is the equation $6 \times \frac{1}{5} = \frac{6}{5}$. Below the diagrams is a handwritten explanation:

$3 \times \frac{2}{5} = 6$ then add in the five $\frac{6}{5}$
 Then $6 \times \frac{1}{5} = 6$ then go back and add
 the five again $\frac{6}{5}$ they both equal
 $\frac{6}{5}$ so they both are equivalent

Anchor 7

Litho 461945

Total Content Points: 1 (4.NF.B.4b)

Total Practice Points: 0

The student indicates an understanding that $3 \times \frac{2}{5}$ is equal to $6 \times \frac{1}{5}$ by drawing two diagrams, one illustrating $3 \times \frac{2}{5}$ and one representing $6 \times \frac{1}{5}$, and indicating that both represent $\frac{6}{5}$ (4.NF.B.4b).

The student does not provide an accurate explanation showing that the two expressions are equivalent (no credit for MP3).

Total Awarded Points: 1 out of 2

Task 4. Bill's Claim Task

Bill claims that the expressions $3 \times \frac{2}{5}$ and $6 \times \frac{1}{5}$ are equivalent.

Draw and label diagrams and give a written explanation to show that the two expressions are equivalent.

$\frac{2}{5} + \frac{2}{5} + \frac{2}{5} = \frac{6}{5}$
 $\frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} = \frac{6}{5}$
 yes they are equivalent
 $x3 = \frac{6}{5}$
 $x6 = \frac{6}{5}$

Anchor 8

Litho 461663

Total Content Points: 0

Total Practice Points: 1 (MP3)

The student unsuccessfully attempts to model that $3 \times \frac{2}{5}$ is equal to $6 \times \frac{1}{5}$. The student provides two addition equations, but the diagrams provided are not accurate and do not sufficiently indicate that both expressions equal $\frac{6}{5}$ (no credit for 4.NF.B.4b). The student uses the equations $\left(\frac{2}{5} + \frac{2}{5} + \frac{2}{5} = \frac{6}{5} \text{ and } \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} = \frac{6}{5} \right)$ to explain why the two expressions are equivalent (MP3).

Total Awarded Points: 1 out of 2

Task 4. Bill's Claim Task

Bill claims that the expressions $3 \times \frac{2}{5}$ and $6 \times \frac{1}{5}$ are equivalent.

Draw and label diagrams and give a written explanation to show that the two expressions are equivalent.

Bill $3 \times \frac{2}{5} = 1\frac{1}{5}$

Bill $6 \times \frac{1}{5} = 1\frac{1}{5}$

I did both of them on a calculator and they both gave me $1\frac{1}{5}$.

The diagrams illustrate the multiplication of fractions using area models. In the first diagram, three boxes representing $\frac{2}{5}$ are multiplied by one box representing $\frac{2}{5}$. Each box is divided into five equal parts. The first diagram shows three boxes, each with two shaded circles, multiplied by one box with two shaded circles and three unshaded circles. The result is one full box and one shaded circle, representing $1\frac{1}{5}$. The second diagram shows six boxes, each with one shaded circle, multiplied by one box with one shaded circle and four unshaded circles. The result is also one full box and one shaded circle, representing $1\frac{1}{5}$.

Anchor 9

Litho 467462

Total Content Points: 0

Total Practice Points: 0

The student unsuccessfully attempts to model that $3 \times \frac{2}{5}$ is equal to $6 \times \frac{1}{5}$. The student does not provide clear diagrams that indicate a relationship, nor does the student provide diagrams that indicate both expressions represent $\frac{6}{5}$ (no credit for 4.NF.B.4b). The student does not provide a reasonable explanation (“I did both of them on a calculator and they both gave me $1\frac{1}{5}$ ”) (no credit for MP3).

Task 4. Bill's Claim Task

Bill claims that the expressions $3 \times \frac{2}{5}$ and $6 \times \frac{1}{5}$ are equivalent.

Draw and label diagrams and give a written explanation to show that the two expressions are equivalent.

$3 \times \frac{2}{5} = \frac{6}{5}$ $6 \times \frac{1}{5} = \frac{6}{5}$
 $6 \times \frac{1}{5} = \frac{6}{5}$ $3 \times \frac{2}{5} = \frac{6}{5}$

they are equivalent fractions

Anchor 10

Litho 460760

Total Content Points: 0

Total Practice Points: 0

The student unsuccessfully attempts to model that $3 \times \frac{2}{5}$ is equal to $6 \times \frac{1}{5}$. The student does not provide clear diagrams to indicate a relationship or clear diagrams indicating both expressions represent $\frac{6}{5}$ (no credit for 4.NF.B.4b). The student does not provide a reasonable explanation to show that the two expressions are equivalent (“they are equalivant fractions”) (no credit for MP3).