Tennessee Comprehensive Assessment Program

TCAP/CRA 2013

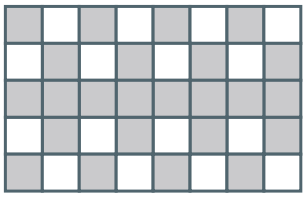
6

Task 2 Scoring Guide

Lunchroom Tiles Task

Task 2. Lunchroom Tiles Task

Raymond, Sasha, and Tonya are discussing the tile pattern on the back wall of their lunchroom, as shown below.



Raymond says, “I looked at the first row going across. There are 8 tiles altogether and 4 of them are gray. So 4 out of 8 tiles in the whole pattern must be gray, and that is equal to a ratio of $\frac{1}{2}$.”

Sasha says, “There are 5 tiles in each column going up and down and in each column there are 3 gray tiles. So the ratio of gray tiles to total tiles in the pattern must be $\frac{3}{5}$.”

Tonya says, “I looked at 2 columns together and counted 10 tiles. I determined that 60% of them are gray.”

Evaluate each student’s argument and use ratios to explain why you agree or disagree with each student.

2. Lunch Room Tiles Task Scoring Guide

The CCSS for Mathematical Content (2 points)

6.RP.A.3 Demonstrates that the ratio of gray tiles to total number of tiles is $\frac{3}{5}$, not $\frac{1}{2}$, in any of the following ways: _____

- scaling, e.g., $\frac{24}{40}=\frac{12}{20}=\frac{6}{10}=\frac{3}{5}$.
- using a proportion or proportional reasoning (e.g., $\frac{24}{40}\neq\frac{1}{2}$).
- scaling up or down using a table.
- using a tape diagram, e.g.,

IIIIIIII	IIIIIIII	IIIIIIII			Gray 24
IIIIIIII	IIIIIIII	IIIIIIII	IIIIIIII	IIIIIIII	Total 40

(1 Point)

6.RP.A.3c Demonstrates recognition that percent means "out of 100" in any of the following ways: _____

- scaling in fraction form, e.g., $\frac{3}{5}$ or $\frac{6}{10}$ to $\frac{60}{100}$, and observing $\frac{60}{100}$ is equal to 60%.
- observing that 60% = $\frac{60}{100}$ and scaling that down to $\frac{3}{5}$, $\frac{6}{10}$, or $\frac{24}{40}$.
- reasoning visually from the figure; e.g., the figure has 40 tiles, so iterating the figure 2.5 times will yield 100 tiles. Since 24 of the tiles in the figure are gray, multiplying 24 times 2.5 will give the number of gray tiles out of 100. 60 out of 100 tiles will be gray, so 60% of the tiles are gray.
- dividing, e.g., $3\div5=0.6=\frac{60}{100}=60\%$ OR $24\div40=0.6=\frac{60}{100}=60\%$.
- setting up and solving a proportion, e.g., $\frac{3}{5}=\frac{?}{100}$, $\frac{60}{100}$, 60%.
- equating in any way $\frac{3}{5}$ or $\frac{6}{10}$ to 60%.

(1 Point)

Total Content Points _____

The CCSS for Mathematical Practice (2 points)

MP3 Cites evidence coherently and uses consistent calculations to support agreement or disagreement with Sasha, Tonya, and Raymond. _____

(1 Point)

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

MP7 Indicates with equations, ratios, or arguments that a multiplicative relationship exists when a pattern is repeated. _____

(1 Point)

(MP7: Look for and make use of structure.)

Total Practice Points _____

Total Awarded Points _____

The CCSS for Mathematical Content Addressed in This Task

Understand ratio concepts and use ratio reasoning to solve problems.

6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

6.RP.A.3c Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.

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 2. Lunchroom Tiles Task

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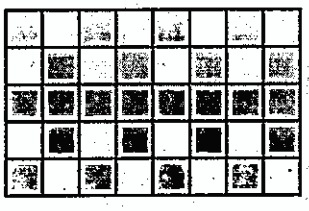


Raymond says, "I looked at the first row going across. There are 8 tiles altogether and 4 of them are gray. So 4 out of 8 tiles in the whole pattern must be gray, and that is equal to a ratio of $\frac{1}{2}$."

Sasha says, "There are 5 tiles in each column going up and down and in each column there are 3 gray tiles. So the ratio of gray tiles to total tiles in the pattern must be $\frac{3}{5}$."

Tonya says, "I looked at 2 columns together and counted 10 tiles. I determined that 60% of them are gray."

Evaluate each student's argument and use ratios to explain why you agree or disagree with each student.

- Raymond: I disagree with his agrument because not every line on this pattern has 4 gray squares. Line 3 has 8 gray squares. So, the ratio of the pattern is really 24:40.

- Sasha: I agree with her agrument because there are 3 out 5 gray tiles on the lines going up and down. And, total there are 24 out of 40 gray tiles. Also, if you divide 24 by 8, and 40 by 8, you get the ratio 3 to 5.

- Tonya: I agree with Tonya's argument because if she counted 10 tiles in 2 columns, 6 out of 10 of them are gray. Well, if you multiply 10 by 10 and 6 by 10 you get the ratio 60 to 100. And, 60 out of 100 equals 60%. So, she is correct.

Guide 1 Litho 646888

Total Content Points: 2 (6.RP.A.3, 6.RP.A.3c)

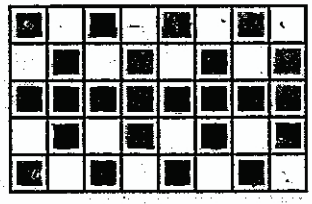
Total Practice Points: 2 (MP3, MP7)

The student demonstrates that the ratio of gray tiles to total tiles is $\frac{3}{5}$ by stating that "total there are 24 out of 40 gray tiles. Also, if you divide 24 by 8, and 40 by 8, you get the ratio 3 to 5" (6.RP.A.3). This reasoning also recognizes that a multiplicative relationship exists when a pattern is repeated (MP7). The student correctly verifies the percentage stated by Tonya ("6 out of 10 of them are gray . . . multiply 10 by 10 and 6 by 10 you get the ratio 60 to 100. And, 60 out of 100 equals 60%") (6.RP.A.3c). Overall, the student coherently cites evidence to agree with Sasha and Tonya and disagree with Raymond (MP3).

Total Awarded Points: 4 out of 4

Task 2. Lunchroom Tiles Task

Raymond, Sasha, and Tonya are discussing the tile pattern on the back wall of their lunchroom, as shown below.

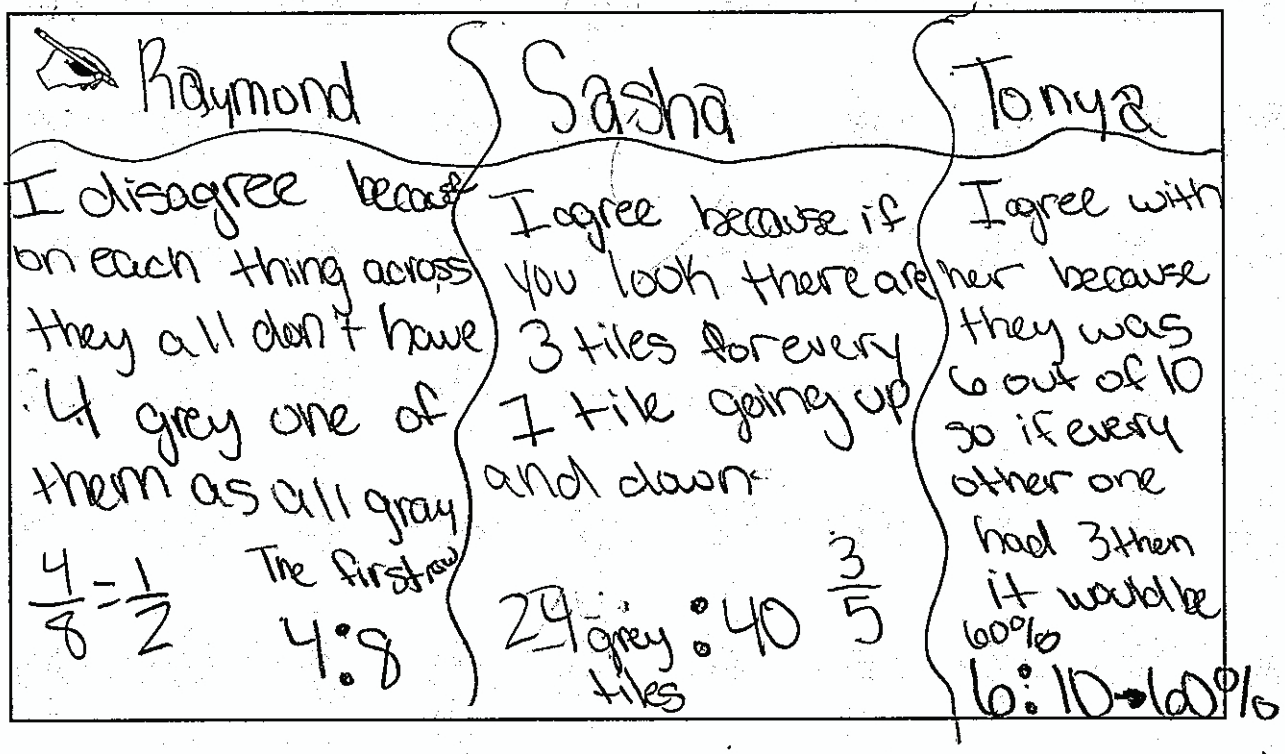


Raymond says, "I looked at the first row going across. There are 8 tiles altogether and 4 of them are gray. So 4 out of 8 tiles in the whole pattern must be gray, and that is equal to a ratio of $\frac{1}{2}$."

Sasha says, "There are 5 tiles in each column going up and down and in each column there are 3 gray tiles. So the ratio of gray tiles to total tiles in the pattern must be $\frac{3}{5}$."

Tonya says, "I looked at 2 columns together and counted 10 tiles. I determined that 60% of them are gray."

Evaluate each student's argument and use ratios to explain why you agree or disagree with each student.



Guide 2 Litho 685354

Total Content Points: 2 (6 RP.A.3, 6.RP.A.3c)

Total Practice Points: 2 (MP3, MP7)

The student demonstrates that the ratio of gray tiles to total tiles is $\frac{3}{5}$ (the comment for Sasha that "3 tiles for every 1" is disregarded and read as a minor error in expression, rather than an error in mathematical understanding since the student correctly shows that "24 grey tiles : 40" is $\frac{3}{5}$) (6.RP.A.3). This work also indicates that a multiplicative relationship exists when a pattern is repeated (MP7). The student correctly verifies for the percentage stated by Tonya ("6 out of 10 . . . it would be 60%"; "6:10 $\rightarrow$ 60%") (6.RP.A.3c). Overall, the student coherently cites evidence to agree with Sasha and Tonya and disagree with Raymond (MP3).

Total Awarded Points: 4 out of 4

Task 2. Lunchroom Tiles Task

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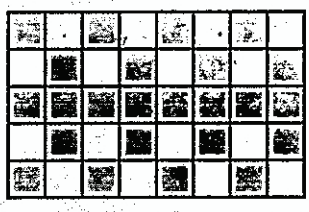

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Sasha says, "There are 5 tiles in each column going up and down and in each column there are 3 gray tiles. So the ratio of gray tiles to total tiles in the pattern must be $\frac{3}{5}$."

Tonya says, "I looked at 2 columns together and counted 10 tiles. I determined that 60% of them are gray."

Evaluate each student's argument and use ratios to explain why you agree or disagree with each student.

$\frac{4}{8} = \frac{1}{2}$ ✓ $\frac{3}{5}$ $\frac{6}{10} = \frac{3}{5} = 0.60 = 60\%$

$\frac{24}{40} = \frac{3}{5}$

Guide 3 Litho 696741

Total Content Points: 2 (6.RP.A.3, 6.RP.A.3c)

Total Practice Points: 1 (MP7)

The student demonstrates that the ratio of gray tiles to total tiles is $\frac{3}{5}$ $\left(\frac{24}{40}=\frac{3}{5} \text{ and } \frac{6}{10}=\frac{3}{5}\right)$ (6.RP.A.3). This work also indicates that a multiplicative relationship exists when a pattern is repeated (MP7). The student correctly verifies the percentage stated by Tonya $\left(\frac{6}{10}=0.60=60\%\right)$ (6.RP.A.3c). Although the work shown does demonstrate an understanding of how to reduce and convert ratios as fractions, the lack of labeling or written explanations means that the student has not coherently cited evidence or used the work to agree or disagree with Sasha, Tonya, and Raymond (no credit for MP3).

Total Awarded Points: 3 out of 4

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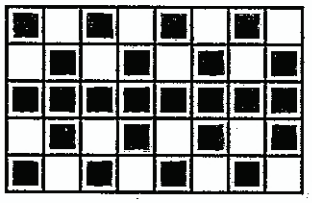


Raymond says, "I looked at the first row going across. There are 8 tiles altogether and 4 of them are gray. So 4 out of 8 tiles in the whole pattern must be gray, and that is equal to a ratio of $\frac{1}{2}$."

Sasha says, "There are 5 tiles in each column going up and down and in each column there are 3 gray tiles. So the ratio of gray tiles to total tiles in the pattern must be $\frac{3}{5}$."

Tonya says, "I looked at 2 columns together and counted 10 tiles. I determined that 60% of them are gray."

Evaluate each student's argument and use ratios to explain why you agree or disagree with each student.

I disagree with Raymond because he forgot about the third row which is all gray.

gray $\frac{24}{40} = \frac{3}{5}$ or 60% are gray
total

Guide 4 Litho 648216

Total Content Points: 2 (6.RP.A.3, 6.RP.A.3c)

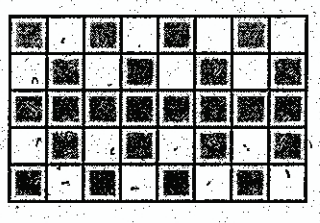
Total Practice Points: 1 (MP7)

The student demonstrates that the ratio of gray tiles to total tiles is $\frac{3}{5}$ $\left(\frac{\text{gray}}{\text{total}} \ \frac{24}{40} = \frac{3}{5} \text{ or } 60\%\right)$ (6.RP.A.3). This work also indicates that a multiplicative relationship exists when a pattern is repeated (MP7). The work shown verifies the percentage stated by Tonya (6.RP.A.3c). Although the student supports disagreement with Raymond, there is no argument formulated for Sasha or Tonya (no credit for MP3).

Total Awarded Points: 3 out of 4

Task 2. Lunchroom Tiles Task

Raymond, Sasha, and Tonya are discussing the tile pattern on the back wall of their lunchroom, as shown below.



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Tonya says, "I looked at 2 columns together and counted 10 tiles. I determined that 60% of them are gray."

Evaluate each student's argument and use ratios to explain why you agree or disagree with each student.

Raymond: I disagree with him because there is 1 whole row of gray tiles while the rest have 4 gray and 8 white or 4:8

Sasha: I agree with Sasha because if you look in each row up and down, there is 3 gray and 2 white or 3:2

Tonya: I agree with her because out of the 10 tiles, 6 are gray. 10 goes into 100 ten times so each column = 10%. So 6 columns = 60% or 6:10

Litho#: 656117

Guide 5 Litho 656117

Total Content Points: 1 (6.RP.A.3c)

Total Practice Points: 1 (MP3)

The student does not demonstrate that the ratio of gray tiles to total tiles is $\frac{3}{5}$ (no credit for 6.RP.A.3). The student does not indicate that a multiplicative relationship exists when a pattern is repeated (no credit for MP7). The student verifies the percentage stated by Tonya ("because out of the 10 tiles, 6 are gray. 10 goes into 100 ten times so each column = 10% so 6 columns = 60%") (6.RP.A.3c). Overall, the student coherently cites evidence using the information from the task to support agreement with Sasha ("in each row up and down, there is 3 gray and 2 white or 3:2") and Tonya and also to support disagreement with Raymond ("1 whole row of gray tiles while the rest have 4 gray and 8 white") (MP3).

Total Awarded Points: 2 out of 4

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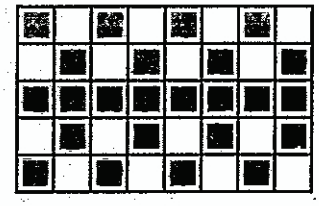

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Tonya says, "I looked at 2 columns together and counted 10 tiles. I determined that 60% of them are gray."

Evaluate each student's argument and use ratios to explain why you agree or disagree with each student.

There are 40 tiles in all and 24 are gray. I think Sasha is right because if you simplify $\frac{24}{40}$ you will get $\frac{3}{5}$.

Litho#: 693513

Guide 6 Litho 693513

Total Content Points: 1 (6.RP.A.3)

Total Practice Points: 1 (MP7)

The student demonstrates that the ratio of gray tiles to total tiles is $\frac{3}{5}$: "simplify $\frac{24}{40}$ you will get $\frac{3}{5}$" (6.RP.A.3). The explanation also indicates that a multiplicative relationship exists when a pattern is repeated (MP7). The student does not verify the percentage stated by Tonya (no credit for 6.RP.A.3c). Although the student supports agreement with Sasha, no arguments are formulated for Tonya or Raymond (no credit for MP3).

Total Awarded Points: 2 out of 4

Task 2. Lunchroom Tiles Task

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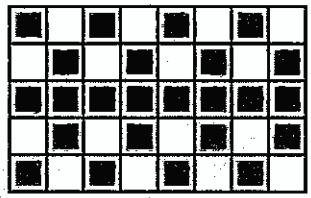

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Sasha says, "There are 5 tiles in each column going up and down and in each column there are 3 gray tiles. So the ratio of gray tiles to total tiles in the pattern must be $\frac{3}{5}$."

Tonya says, "I looked at 2 columns together and counted 10 tiles. I determined that 60% of them are gray."

Evaluate each student's argument and use ratios to explain why you agree or disagree with each student.

I agree. Each row going down has 3 grey tiles. So if you look at any 2 rows, 60% of the tiles are grey.

60% = 6

6 = 60%

Guide 7 Litho 662775

Total Content Points: 1 (6.RP.A.3c)

Total Practice Points: 0

The student does not demonstrate that the ratio of gray tiles to total tiles is $\frac{3}{5}$ (no credit for 6.RP.A.3). The student does not show that a multiplicative relationship exists when a pattern is repeated (no credit for MP7). The student correctly finds the percentage of gray tiles (6 = 60%, with a diagram showing 6 gray tiles out of 10 total tiles) (6.RP.A.3c). The student does not coherently cite evidence or use the work completed to agree or disagree with Sasha or Raymond, although the work appears to indicate agreement with Tonya (no credit for MP3).

Total Points Awarded: 1 out of 4

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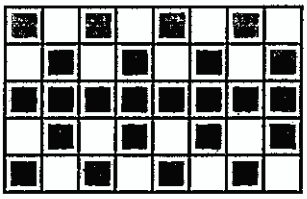

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Tonya says, "I looked at 2 columns together and counted 10 tiles. I determined that 60% of them are gray."

Evaluate each student's argument and use ratios to explain why you agree or disagree with each student.

Raymond	Tonya	Sasha
is right about the 1st line because the ratio of gray tiles to white is one half, but the pattern of tiles changes	tonya is right because the way she looked at the tiles she had a pattern so 60% of them are gray	Sasha is right also just like Tonya only she used a fraction instead of a percent.

Litho#: 667925

Guide 8 Litho 667925

Total Content Points: 0

Total Practice Points: 1 (MP3)

The student does not demonstrate that the ratio of gray tiles to total tiles is $\frac{3}{5}$ (no credit for 6.RP.A.3). The student does not show that a multiplicative relationship exists when a pattern is repeated (no credit for MP7). The student does not verify the percentage stated by Tonya (no credit for 6.RP.A.3c). However, the student provides support for agreement with Sasha and Tonya, and recognizes that Raymond is correct about the first row but that the pattern changes (MP3).

Total Awarded Points: 1 out of 4

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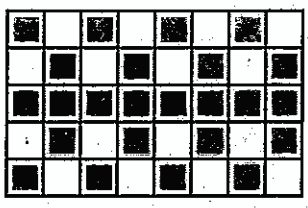

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Tonya says, "I looked at 2 columns together and counted 10 tiles. I determined that 60% of them are gray."

Evaluate each student's argument and use ratios to explain why you agree or disagree with each student.

There are 10 tiles with two colums together. So the ratio of gray tiles to white is 24:16.

Guide 9 Litho 648312

Total Content Points: 0

Total Practice Points: 0

The student does not find the correct ratio of gray tiles to total tiles (“So the ratio of all Gray tiles to White is 24:16”) and therefore does not demonstrate that the ratio of gray tiles to total tiles is $\frac{3}{5}$ (no credit for 6.RP.A.3). The student does not indicate that a multiplicative relationship exists when a pattern is repeated (no credit for MP7). The student does not verify the percentage stated by Tonya (no credit for 6.RP.A.3c). The student does not coherently cite evidence or use calculations to agree or disagree with Sasha, Tonya, and Raymond (no credit for MP3).

Total Awarded Points: 0 out of 4

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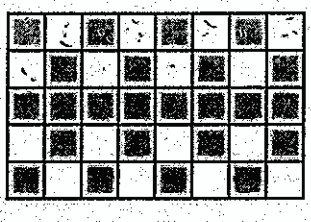

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Tonya says, "I looked at 2 columns together and counted 10 tiles. I determined that 60% of them are gray."

Evaluate each student's argument and use ratios to explain why you agree or disagree with each student.

I agree with all of them except Tonya There are 8 in each row so that really equals 16.

Guide 10 Litho 661213

Total Content Points: 0

Total Practice Points: 0

The student does not demonstrate that the ratio of gray tiles to total tiles is $\frac{3}{5}$ (no credit for 6.RP.A.3). The student does not indicate that a multiplicative relationship exists when a pattern is repeated (no credit for MP7). The student does not verify the percentage stated by Tonya (no credit for 6.RP.A.3c). The student does not coherently cite evidence or use calculations to support agreement with Sasha and Raymond and disagreement with Tonya (no credit for MP3).

Total Awarded Points: 0 out of 4