

Tennessee Comprehensive Assessment Program

TCAP/CRA 2013



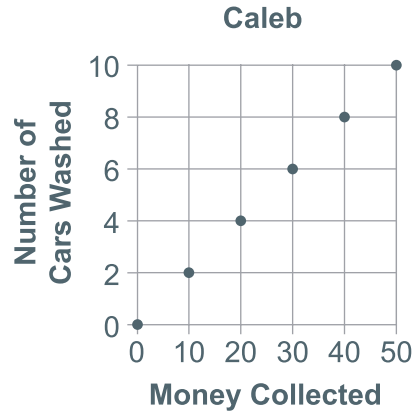
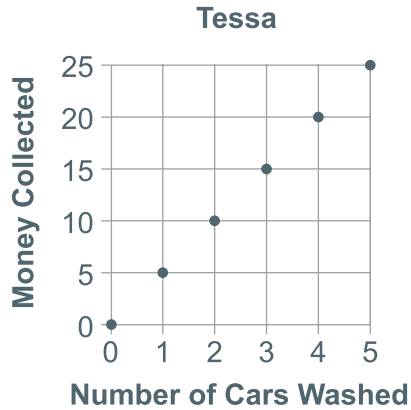
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Task 4 Scoring Guide


Car Wash Task

Task 4. Car Wash Task

Moses High School held a car wash fundraiser for their girls' basketball team. Tessa and Caleb are students at Moses High School. Each recorded some information about the money collected and the number of cars washed.



- a. Tessa and Caleb both claim that their graphs represent proportional relationships. Use mathematical reasoning to agree or disagree with their claims.





- b. Caleb thinks that the graphs represent the same situation but show different unit rates. Explain Caleb's reason for arguing that the graphs show different unit rates.



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- c. What does each unit rate mean in the context of the car wash fundraiser?



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WORK IF YOU
HAVE TIME.



4. Car Wash Task Scoring Guide

The CCSS for Mathematical Content (1 point)

7.RP.2a Tests for proportionality by any of the following: _____

- identifying that both sets of data fall in a straight line passing through the origin.
- identifying that both sets of data change at a constant rate and include the corresponding values of 0 cars and \$0: e.g., in Tessa's graph, for every 1 car there is a cost of \$5, and in Caleb's data, for every \$10 collected, 2 cars are washed.
- using the data from both graphs, dividing the money collected by the number of cars washed for every given point and/or dividing the number of cars washed by the money collected, and noting that the quotients are constant.
- noting that, as the number of cars (money collected) doubles (triples, etc.), the money collected (number of cars) also doubles (triples, etc.).
- using all the points on the graph, creating a table and/or forming ratios from Tessa's data, and noting the resulting ratios are equivalent; doing the same for Caleb's data.

(1 Point)

Total Content Points _____

The CCSS for Mathematical Practice (2 points)

MP1 Provides an appropriate strategy for testing proportionality. Demonstrates an understanding of the data represented in both graphs and the difference between the representations. _____

(1 Point)

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

MP3 Explains that Caleb determined the unit rates were different for each graph by any of the following: _____

- using the data within the graph. For Tessa, dividing the money collected by the number of cars washed; for Caleb, dividing the number of cars washed by the money collected.
- representing the data from the graph by writing equations for each line (Tessa as $y = 5x$ and Caleb as $y = 0.2x$) and identifying the coefficient of x as the constant unit rate.
- counting and determining rise/run between data points.
- identifying the point $(1, r)$ on each line, where r is the y -coordinate of the point, and also indicating the unit rate.
- calculating the slope of each line that models the data by choosing 2 points from the graph and applying any form of the slope (m) formula.
- noting that the unit rate for Tessa's graph is the amount of money collected divided by the number of cars washed and the unit rate for Caleb's graph is the number of cars washed divided by the amount of money collected.

(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

Analyze proportional relationships and use them to solve real-world and mathematical problems.

- 7.RP.A.2a Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

The CCSS for Mathematical Practice*

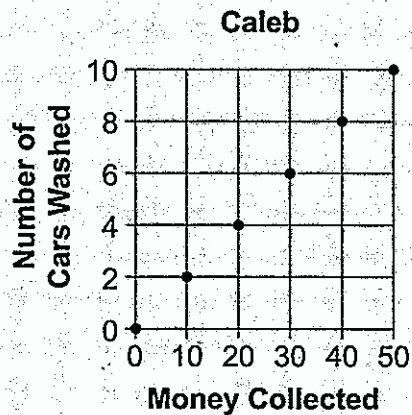
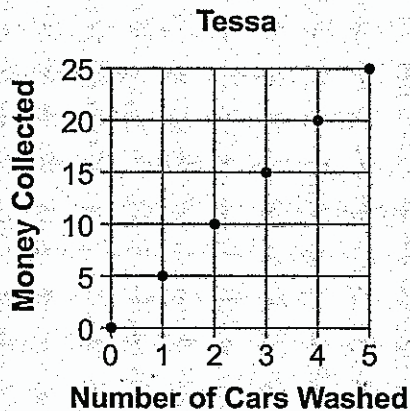
1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look 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. Car Wash Task

Moses High School held a car wash fundraiser for their girls' basketball team. Tessa and Caleb are students at Moses High School. Each recorded some information about the money collected and the number of cars washed.



- a. Tessa and Caleb both claim that their graphs represent proportional relationships. Use mathematical reasoning to agree or disagree with their claims.

Tessa

0 $\frac{1}{5}$ $\frac{2}{10}$ $\frac{3}{15}$ $\frac{4}{20}$ $\frac{5}{25}$


all of tessa's #'s of cars and money are proportional because they all equal $\frac{1}{5}$.

Caleb


0 $\frac{10}{2}$ $\frac{20}{4}$ $\frac{30}{6}$ $\frac{40}{8}$ $\frac{50}{10}$

Caleb's are also proportional because once you reduce his you get 5 on each one.

- b. Caleb thinks that the graphs represent the same situation but show different unit rates. Explain Caleb's reason for arguing that the graphs show different unit rates.

 Caleb is right it does represent the same situation because even though they have different unit rates they still are proportional because you divide each number into money collected. That's for Caleb. Tessa is the same way but set up differently she uses # over money which gave her $\frac{1}{5}$ each time.

- c. What does each unit rate mean in the context of the car wash fundraiser?

 Tessa's = # of cars washed over money collected.

Caleb's = money collected over #'s of cars washed.

But both are proportional because they equal the same # on each unit rate.

Anchor 1 Litho 747103

Total Content Points: 1 (7.RP.A.2a)

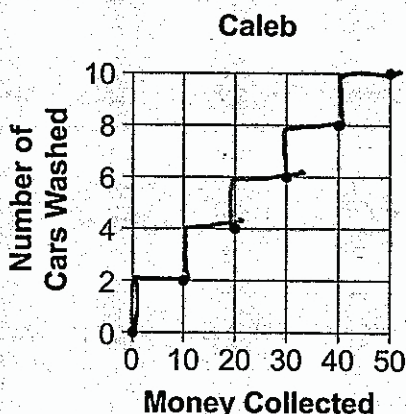
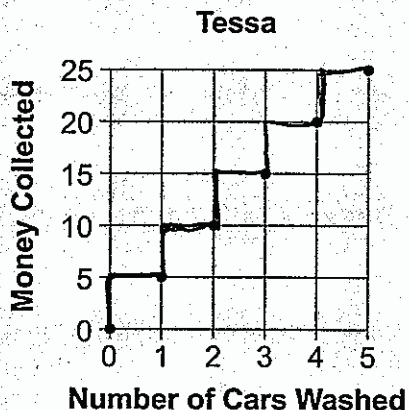
Total Practice Points: 2 (MP1, MP3)

The student uses all the points on both graphs in Part A to form equivalent ratios of $\frac{1}{5}$ for Tessa and 5 for Caleb, determining that both Tessa’s and Caleb’s graphs represent proportional relationships (7.RP.A.2a). The student provides an acceptable logical argument in Part B by noting that the unit rates are reciprocals (“switched”) that represent the same situation; Caleb’s rate is defined as “divide each number into money collected” and Tessa’s rate is defined as “use # over money” (MP3). The student provides an appropriate strategy for testing proportionality in Part A, demonstrates an understanding of the data represented in both graphs, and explains the difference between the representations of the situation by giving the correct meaning of both unit rates in the context of the task (MP1).

Total Awarded Points: 3 out of 3

Task 4. Car Wash Task

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- a. Tessa and Caleb both claim that their graphs represent proportional relationships. Use mathematical reasoning to agree or disagree with their claims.

I agree with their claims.

Tessa's Graph

$$\frac{5}{1} = 5 \quad \frac{10}{2} = 5$$

$$\frac{15}{3} = 5 \quad \frac{20}{4} = 5$$

$$\frac{25}{5} = 5$$

They all equal.
They are proportional.

Caleb's Graph

$$\frac{2}{10} = \frac{1}{5} \quad \frac{4}{20} = \frac{1}{5}$$


$$\frac{6}{30} = \frac{1}{5} \quad \frac{8}{40} = \frac{1}{5}$$

$$\frac{10}{50} = \frac{1}{5}$$


They all equal.
They are proportional.

- b. Caleb thinks that the graphs represent the same situation but show different unit rates. Explain Caleb's reason for arguing that the graphs show different unit rates.

A-2b

 Caleb's reasoning for arguing is he's finding the unit rate a wrong way instead of the right way which gives him the wrong answer.

- c. What does each unit rate mean in the context of the car wash fundraiser?

 <u>Tessa</u> money collected per car washed.	<u>Caleb</u> <u>number of cars washed</u> money collected.
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REVIEW YOUR
WORK IF YOU
HAVE TIME.

Anchor 2

Litho 784795

Total Content Points: 1 (7.RP.A.2a)

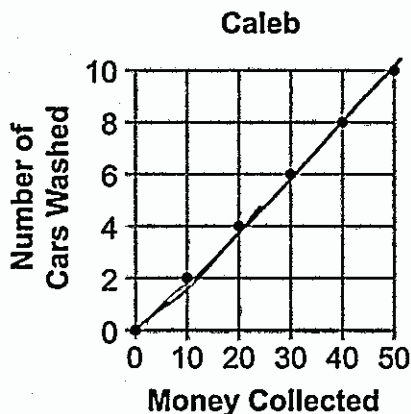
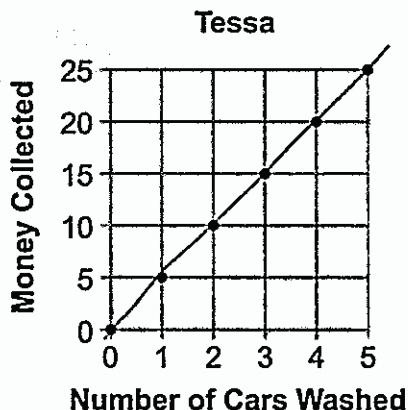
Total Practice Points: 1 (MP1)

The student uses all the points on both graphs to form equivalent ratios, 5 for Tessa and $\frac{1}{5}$ for Caleb, determining that both Tessa's and Caleb's graphs represent proportional relationships (7.RP.A.2a). The student states that Caleb finds the unit rate the wrong way, which is not a reasonable explanation to address Caleb's argument (no credit for MP3). The student provides an appropriate strategy for testing proportionality in Part A, demonstrates an understanding of the data represented in both graphs, and gives the correct meaning of both unit rates in the context of the task (MP1).

Total Awarded Points: 2 out of 3

Task 4. Car Wash Task

Moses High School held a car wash fundraiser for their girls' basketball team. Tessa and Caleb are students at Moses High School. Each recorded some information about the money collected and the number of cars washed.



- a. Tessa and Caleb both claim that their graphs represent proportional relationships. Use mathematical reasoning to agree or disagree with their claims.

Tessa


$5/1 = 5$
 $10/2 = 5$
 $15/3 = 5$

Caleb

$2/10 = 0.2$
 $4/20 = 0.2$
 $6/30 = 0.2$


Yes both of them are proportional because both of the lines on the graphs are straight and pass through (0,0). Also, both of them go up at a constant rate and if you divide y by x on either graph, you would get the same answer.

- b. Caleb thinks that the graphs represent the same situation but show different unit rates. Explain Caleb's reason for arguing that the graphs show different unit rates.



Caleb says that they have different unit rates because Caleb's graph goes up by 2 on the y axis and 10 on the x axis. Tessa's graph goes up by 5 on the y axis and 1 on the x axis. The labels on the x axis and y axis is also different.

- c. What does each unit rate mean in the context of the car wash fundraiser?



Caleb's unit rate means that he washed 20% of a car for every dollar he made. Tessa's unit rate means that she collected \$5 for every car she washed.

Anchor 3 Litho 714256

Total Content Points: 1 (7.RP.A.2a)

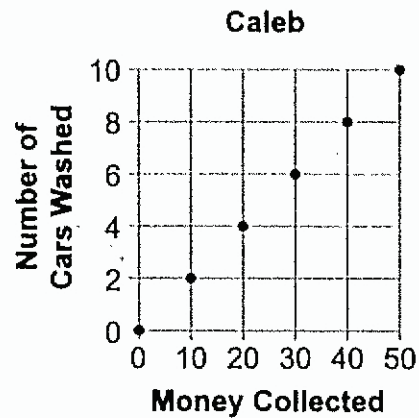
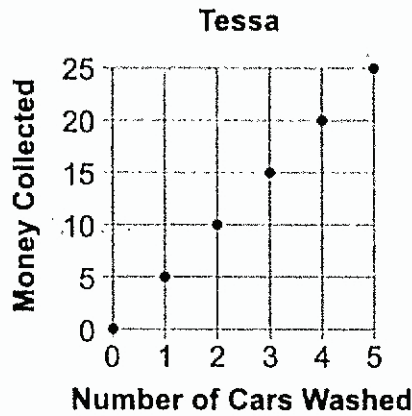
Total Practice Points: 1 (MP1)

The student uses an appropriate strategy in Part A to test for proportionality by noting “both of the lines on the [graphs] are straight and pass through (0, 0)” (7.RP.A.2a). The student explains the changes in the x and y values on the graph, but does not connect these values to the unit rate in the response to Part B (no credit for MP3). The student provides an appropriate strategy for testing proportionality in Part A, demonstrates an understanding of the data represented in both graphs, and shows the difference between the representations in Part C by correctly defining both unit rates in the context of the task (MP1).

Total Awarded Points: 2 out of 3

Task 4. Car Wash Task

Moses High School held a car wash fundraiser for their girls' basketball team. Tessa and Caleb are students at Moses High School. Each recorded some information about the money collected and the number of cars washed.



- a. Tessa and Caleb both claim that their graphs represent proportional relationships. Use mathematical reasoning to agree or disagree with their claims.

Tessa

$\frac{5}{1} = 5$ $\frac{25}{5} = 5$

$\frac{10}{2} = 5$

$\frac{15}{3} = 5$

$\frac{20}{4} = 5$

- All simplified to the same number.

Caleb

$\frac{2}{10} = \frac{1}{5}$ $\frac{10}{50} = \frac{1}{5}$


$\frac{4}{20} = \frac{1}{5}$

$\frac{6}{30} = \frac{1}{5}$


$\frac{8}{40} = \frac{1}{5}$

- All simplified to the same number.

- b. Caleb thinks that the graphs represent the same situation but show different unit rates. Explain Caleb's reason for arguing that the graphs show different unit rates.

 Caleb believes they show different unit rates because the "number of cars" and "money collected" are on different sides of the graph. Also, one equals 5, while the other equals $\frac{1}{5}$. This could confuse some people.

- c. What does each unit rate mean in the context of the car wash fundraiser?

 For every 1 car washed, \$5 is collected.

Anchor 4

Litho 744076

Total Content Points: 1 (7.RP.A.2a)

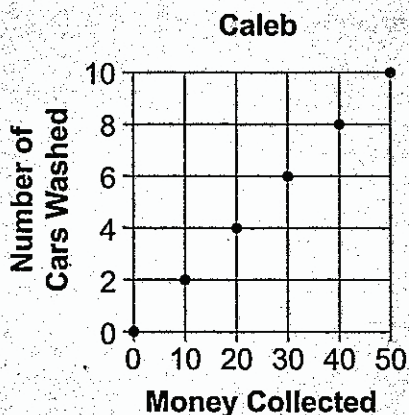
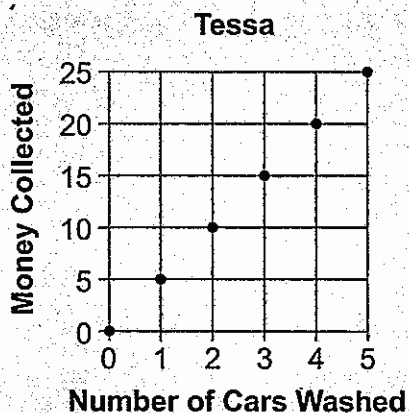
Total Practice Points: 1 (MP3)

The student uses all the points on both graphs in Part A to form equivalent ratios, 5 for Tessa, $\frac{1}{5}$ for Caleb, determining that both Tessa's and Caleb's graphs represent proportional relationships (7.RP.A.2a). The student provides an acceptable logical argument in Part B by noting that the axis labels are switched on the two graphs ("the 'number of cars' and 'money collected' are on different sides of the graph . . . one equals 5, while the other equals $\frac{1}{5}$ ") (MP3). The student provides an appropriate strategy for testing proportionality in Part A and demonstrates an understanding of the data represented in both graphs; however, only one correct unit rate meaning is given in Part C (no credit for MP1).

Total Awarded Points: 2 out of 3

Task 4. Car Wash Task

Moses High School held a car wash fundraiser for their girls' basketball team. Tessa and Caleb are students at Moses High School. Each recorded some information about the money collected and the number of cars washed.



- a. Tessa and Caleb both claim that their graphs represent proportional relationships. Use mathematical reasoning to agree or disagree with their claims.


$T = \frac{5}{1}$ $\frac{10}{2} = \frac{5}{1}$ $\frac{15}{3} = \frac{5}{1}$ $\frac{20}{4} = \frac{5}{1}$ $\frac{25}{5} = \frac{5}{1}$

$C = \frac{2}{10} = \frac{1}{5}$ $\frac{4}{20} = \frac{1}{5}$ $\frac{6}{30} = \frac{1}{5}$ $\frac{8}{40} = \frac{1}{5}$ $\frac{10}{50} = \frac{1}{5}$

The graphs are proportional within themselves. But if you are comparing them they are not proportional.

$5 \neq \frac{1}{5}$


- b. Caleb thinks that the graphs represent the same situation but show different unit rates. Explain Caleb's reason for arguing that the graphs show different unit rates.

 The reason for Caleb's argument is false. Because if you set the right unit rate up, they both equal 5.

$$5 = \frac{25}{5} \quad \frac{25}{5} = 5 \quad \frac{50}{10} = 5 \quad \frac{50}{10} = 5$$

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

- c. What does each unit rate mean in the context of the car wash fundraiser?

 each unit rate means the total number of cars washed in context of all.

Anchor 5

Litho 784753

Total Content Points: 1 (7.RP.A.2a)

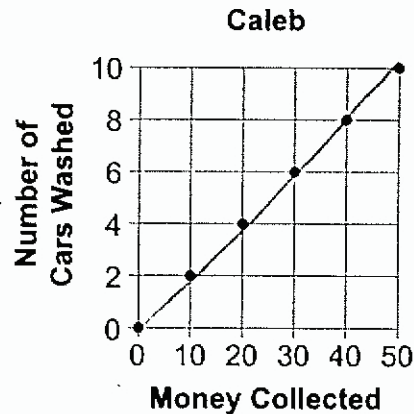
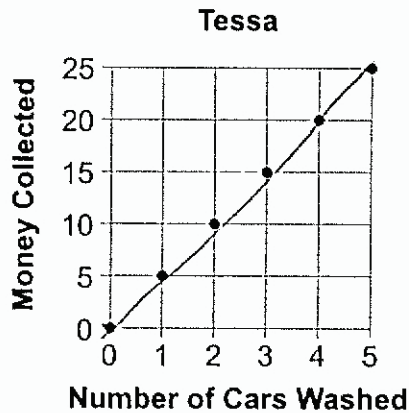
Total Practice Points: 0

The student uses all the points on both graphs in Part A to form equivalent ratios, 5 for Tessa and $\frac{1}{5}$ for Caleb, determining that both Tessa's and Caleb's graphs represent proportional relationships (7.RP.A.2a). The student does not provide an acceptable logical argument in Part B, instead stating that Caleb's argument is false (no credit for MP3). The student provides an appropriate strategy for testing proportionality in Part A, but does not demonstrate clear understanding of the data represented in both graphs and gives only a general statement of unit rate in Part C (no credit for MP1).


Total Awarded Points: 1 out of 3

Task 4. Car Wash Task

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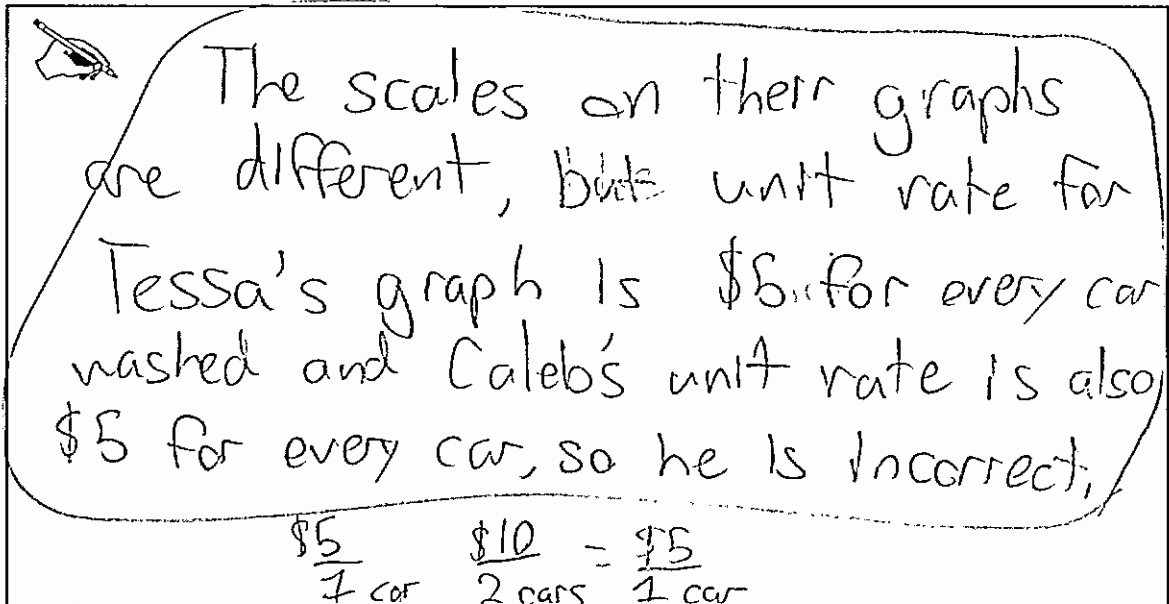


- a. Tessa and Caleb both claim that their graphs represent proportional relationships. Use mathematical reasoning to agree or disagree with their claims.



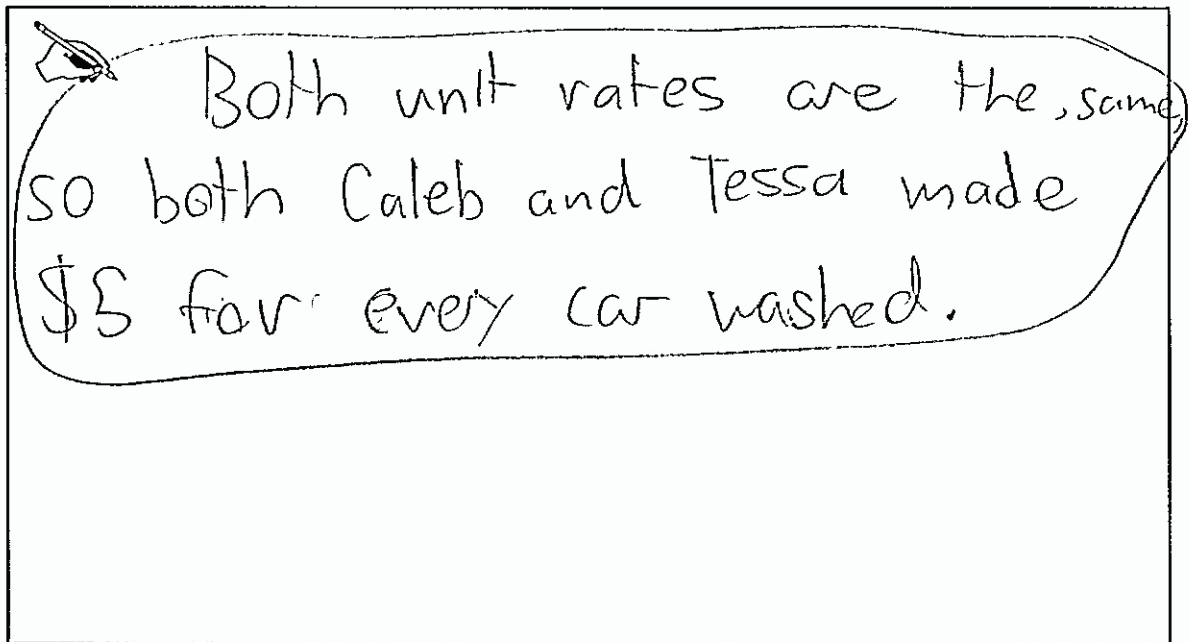
 I agree with their claims.
 Both graphs increase at a steady rate and go through the origin $(0,0)$.

- b. Caleb thinks that the graphs represent the same situation but show different unit rates. Explain Caleb's reason for arguing that the graphs show different unit rates.

 The scales on their graphs are different, but unit rate for Tessa's graph is \$5 for every car washed and Caleb's unit rate is also \$5 for every car, so he is incorrect.

$$\frac{\$5}{1 \text{ car}} = \frac{\$10}{2 \text{ cars}} = \frac{\$5}{1 \text{ car}}$$

- c. What does each unit rate mean in the context of the car wash fundraiser?

 Both unit rates are the same, so both Caleb and Tessa made \$5 for every car washed.

Anchor 6

Litho 712912

Total Content Points: 1 (7.RP.A.2a)

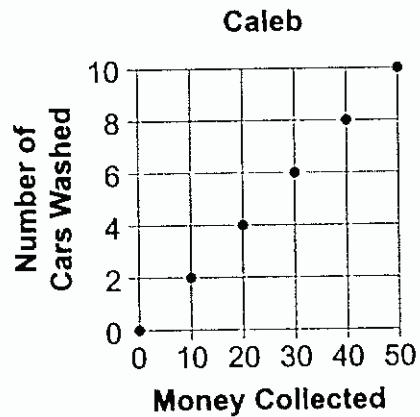
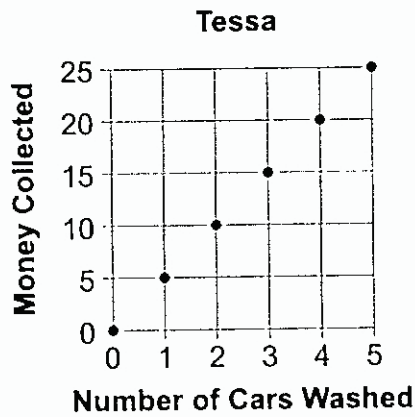
Total Practice Points: 0

The student uses an appropriate strategy in Part A to test for proportionality by drawing straight lines through the data points on both graphs and noting they both “go through the origin (0, 0)” (7.RP.A.2a). The student does not provide an acceptable logical argument in Part B, stating that Caleb is incorrect because “the scales on the graphs are different” but the unit rates are the same (no credit for MP3). The student provides an appropriate strategy for testing proportionality in Part A, but does not demonstrate thorough understanding of the data represented in both graphs, and does not indicate the different meaning for each unit rate in Part C (no credit for MP1).

Total Awarded Points: 1 out of 3

Task 4. Car Wash Task

Moses High School held a car wash fundraiser for their girls' basketball team. Tessa and Caleb are students at Moses High School. Each recorded some information about the money collected and the number of cars washed.



- a. Tessa and Caleb both claim that their graphs represent proportional relationships. Use mathematical reasoning to agree or disagree with their claims.

Tessa & Caleb are correct they do show a proportional relationship

Tessa

$$\frac{1}{5} \rightarrow \frac{2}{10} = 10$$


$$\frac{2}{10} = 10$$


Caleb

$$\frac{10}{2} \rightarrow \frac{20}{4} = 40$$

$$\frac{20}{4} = 40$$


- b. Caleb thinks that the graphs represent the same situation but show different unit rates. Explain Caleb's reason for arguing that the graphs show different unit rates.

 Tessa
 $\frac{1 \text{ car}}{\$5}$

 Caleb
 $\frac{\$10}{2 \text{ car}} = \frac{\$5}{1 \text{ car}}$

they are the same, but different.

- c. What does each unit rate mean in the context of the car wash fundraiser?

 For every 1 car washed, they make 5 dollars.

Anchor 7

Litho 714589

Total Content Points: 0

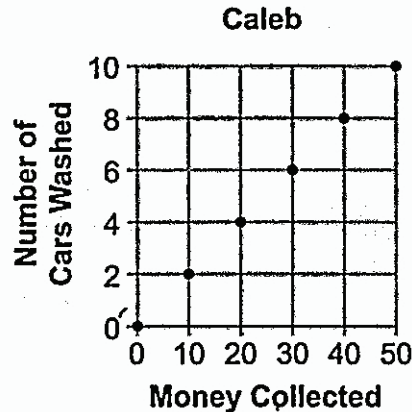
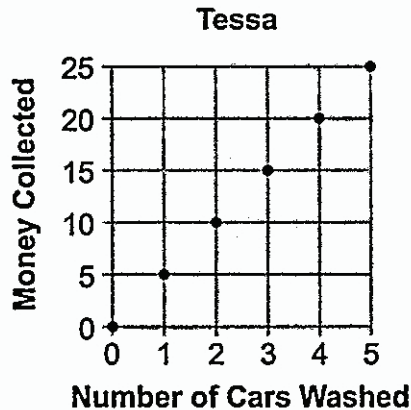
Total Practice Points: 1 (MP3)

The student does not test all the points from the graphs, and therefore does not adequately test for proportionality in Part A (no credit for 7.RP.A.2a). The student provides a logical argument in Part B by giving the unit rate for both Tessa and Caleb and noting “they are the same, but different”; this statement is supported with the ratios $\frac{1 \text{ car}}{\$5}$ for Tessa’s data and $\frac{\$5}{1 \text{ car}}$ for Caleb’s data (MP3). Although an understanding of the data represented in both graphs is demonstrated in Part B, the student does not provide a sufficient test for proportionality in Part A and gives only one general statement in Part C (“for every 1 car washed, they make 5 dollars”) that does not indicate the different meaning for each unit rate (no credit for MP1).

Total Awarded Points: 1 out of 3

Task 4. Car Wash Task

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- a. Tessa and Caleb both claim that their graphs represent proportional relationships. Use mathematical reasoning to agree or disagree with their claims.

It is proportional because each graph, the money collected, and number of cars goes through the origin, 0,0 which is proportional.

$\frac{1}{5}, \frac{2}{10}, \frac{3}{15}, \frac{4}{20}, \frac{5}{25} = \text{Tessa}$
 $\frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \frac{4}{8}, \frac{5}{10} = \text{Caleb}$


Both Proportional

- b. Caleb thinks that the graphs represent the same situation but show different unit rates. Explain Caleb's reason for arguing that the graphs show different unit rates.

 Tessa showed each car, and started with 1, car for 5\$. Caleb showed 2 cars for 10 dollars, but they both show the same since you reduce 2/10.

$$\frac{1}{5} = \frac{2 \div 2}{10 \div 2} = \frac{1}{5} \quad \text{per car each } \frac{1}{5}$$

- c. What does each unit rate mean in the context of the car wash fundraiser?

 That each car you collect \$5.00 for Tessa. For Caleb, you collect \$10.00 for washing 2 cars, which is reduced down to 1 car, \$5 for both Tessa and Caleb.

Anchor 8

Litho 751102

Total Content Points: 0

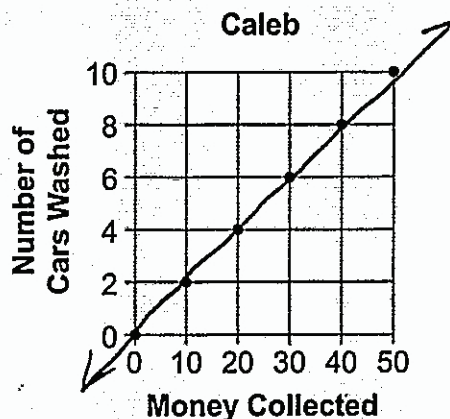
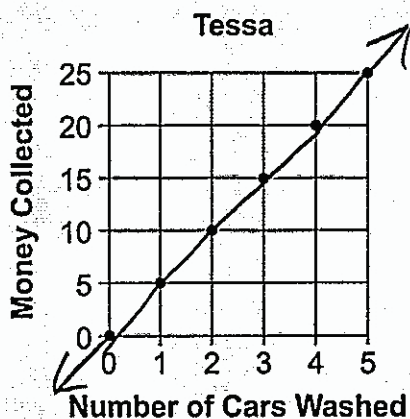
Total Practice Points: 0

The student does not perform an appropriate test for proportionality in Part A: the student notes “through the origin 0, 0”, but does not indicate that each graph is a straight line. Also, the student attempts to show proportionality by showing that the denominators increase at a constant rate, but does not show the multiplicative structure that would indicate a proportional relationship (no credit for 7.RP.A.2a). In Part B, the student explains why the graphs represent the same situation, but does not use the data correctly to show the difference between the unit rates in Tessa’s and Caleb’s data (no credit for MP3). The student does not thoroughly test for proportionality in Part A, does not demonstrate complete understanding of the data represented in both graphs, and does not indicate the different meaning for each unit rate in Part C (no credit for MP1).

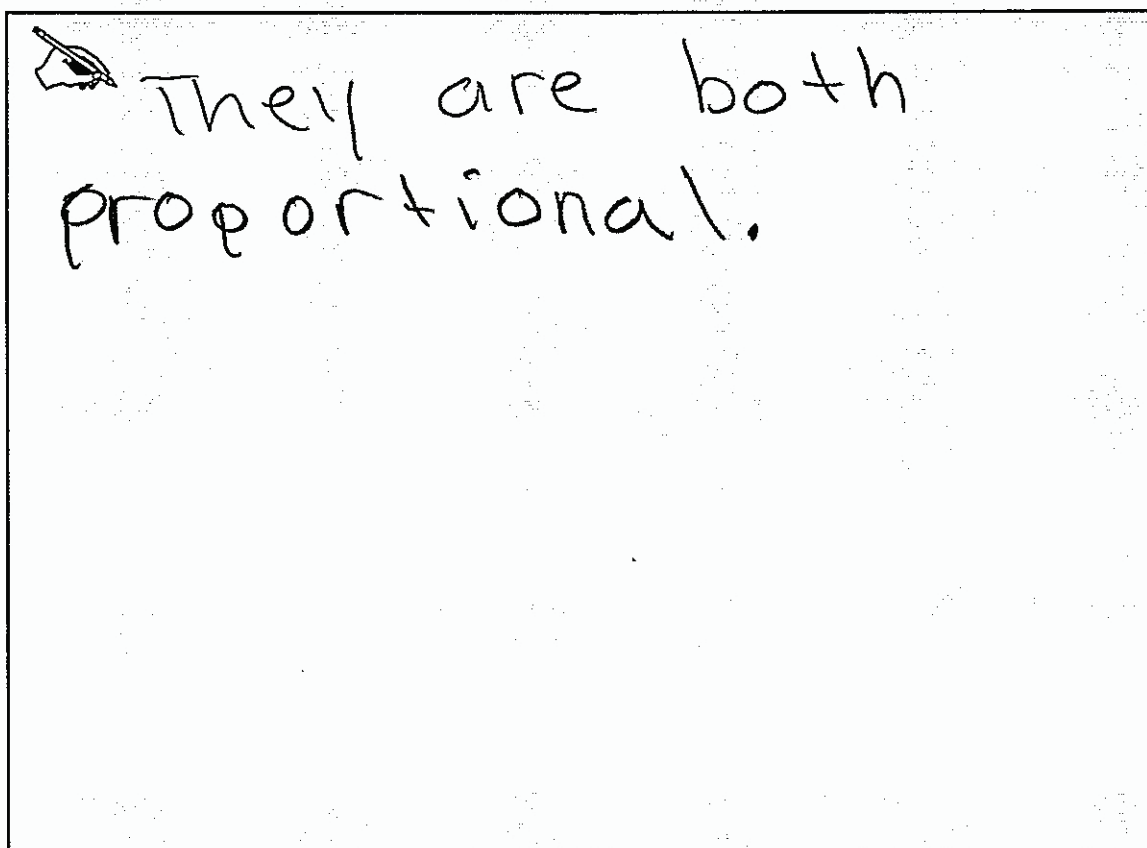
Total Awarded Points: 0 out of 3

Task 4. Car Wash Task


Moses High School held a car wash fundraiser for their girls' basketball team. Tessa and Caleb are students at Moses High School. Each recorded some information about the money collected and the number of cars washed.




- a. Tessa and Caleb both claim that their graphs represent proportional relationships. Use mathematical reasoning to agree or disagree with their claims.



- b. Caleb thinks that the graphs represent the same situation but show different unit rates. Explain Caleb's reason for arguing that the graphs show different unit rates.

 No, because they can be written different →

- c. What does each unit rate mean in the context of the car wash fundraiser?

 Caleb washed more cars than Tessa

Anchor 9

Litho 747501

Total Content Points: 0

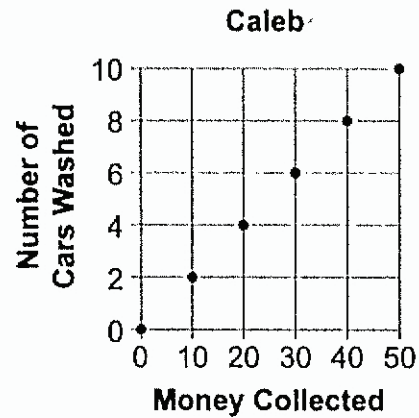
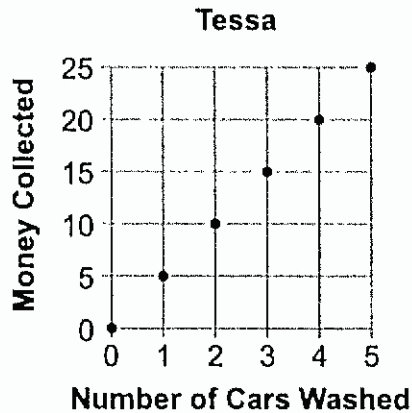
Total Practice Points: 0

The student claims both graphs are proportional and draws a straight line through both sets of data points in Part A, but the student does not specifically indicate an understanding of how to test for proportionality (no credit for 7.RP.A.2a). The student does not provide a logical argument in Part B (no credit for MP3). The student does not state and completely realize a strategy for testing proportionality in Part A, does not demonstrate an understanding of the data represented in both graphs, and does not indicate the different meaning for each unit rate in Part C (no credit for MP1).


Total Awarded Points: 0 out of 3

Task 4. Car Wash Task

Moses High School held a car wash fundraiser for their girls' basketball team. Tessa and Caleb are students at Moses High School. Each recorded some information about the money collected and the number of cars washed.



- a. Tessa and Caleb both claim that their graphs represent proportional relationships. Use mathematical reasoning to agree or disagree with their claims.




N.O.C.W.

Caleb - 2	$\frac{2}{10} = \frac{1}{5}$
Tessa - 1	


M.C

Caleb - 10
Tessa - 5

- b. Caleb thinks that the graphs represent the same situation but show different unit rates. Explain Caleb's reason for arguing that the graphs show different unit rates.

 They are not different because they show the same rate but in different numbers

- c. What does each unit rate mean in the context of the car wash fundraiser?


$$\begin{array}{r} \text{N.O.C.W} \\ \hline 2 \\ \hline \text{M.C.} \\ \hline 10 \\ 5 \end{array}$$

Anchor 10

Litho 710595

Total Content Points: 0

Total Practice Points: 0

The student does not provide an appropriate test for proportionality in Part A, instead choosing a data point from each graph, (10, 2) from Caleb's graph and (1, 5) from Tessa's, and comparing these to each other (no credit for 7.RP.A.2a). Although the student indicates some understanding of the relationship between Caleb's and Tessa's graphs, the explanation presented in Part B does not indicate understanding that the "different numbers" are the unit rates and that "the same rate" is the general situation in the problem (no credit for MP3). The student does not provide an appropriate strategy for testing proportionality in Part A, does not demonstrate an understanding of the data represented in both graphs, and does not indicate the different meaning for each unit rate in Part C (no credit for MP1).

Total Awarded Points: 0 out of 3