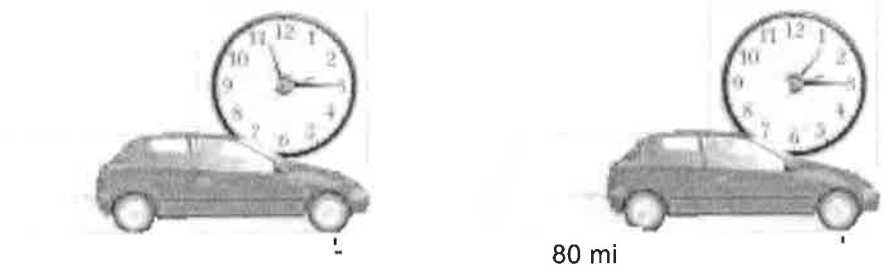
1. Amy and her family were traveling during their vacation. She looked at her watch at Point 1 in the diagram below, and then again at Point 2 in the diagram below. Her mom told her how far they traveled in that time, as noted below.



Point 1 Point 2

   a. Based on this information, what is the unit rate of the car? Explain in words what that unit rate means in the context of the problem.
   b. Amy's dad said that the entire trip was 1200 miles. How many hours will it take to complete the trip? Explain your reasoning in words.

NYC Grade 7 Assessment 1
Amy's Vacation
Benchmark Papers

The response demonstrates some evidence of mathematical knowledge that is appropriate to the intent of the prompted purpose. An effort was made to accomplish the task, but with little success. Evidence in the response demonstrates that, with instruction, the student can revise the work to accomplish the task.

Some evidence of reasoning is demonstrated either verbally or symbolically, but may be based on misleading assumptions, and/or contain errors in execution. Some work is used to find ratios, or unit rates; or partial answers to portions of the task are evident. Explanations are incorrect, incomplete or not based on work shown. Accurate reasoning processes demonstrate the Mathematical Practices, (1) Make sense of problems and persevere in solving them and (2) Reason abstractly and quantitatively (since students need to abstract information from the problem, create a mathematical representation of the problem, and correctly work with the ratio and/or proportion). Evidence of the Mathematical Practice, (3) Construct viable arguments and critique the reasoning of others, is demonstrated by complete and accurate explanations. Evidence of the Mathematical Practice, (4) Model with mathematics, is demonstrated by representing the problem with ratios or proportions. Evidence of the Mathematical Practice, (6) Attend to precision, can include proper use of ratio notation and proper labeling of quantities. Evidence of the Mathematical Practice, (7) Look for and make use of structure, may be demonstrated by student recognition, e.g., that the multiples used in a table need not be of equal intervals (see table below) or that part b may be solved with a properly formed proportion, where the variable is equal to the numbers of hours a 1200-mile trip will take.

The reasoning used to solve the parts of the problem may include:

a. Failing to find a unit rate.
b. Choosing numbers other than 80 miles and 2 hours to scale down; but scaling down in tabular or fraction form to a unit rate consistent with both incorrect numbers chosen; or correctly using a proportion or proportional reasoning to find the unit rate, but choosing a distance other than 80 miles and a time other than 2 hours.
c. Using a proportion or proportional reasoning, but choosing a distance other than 80 miles and a time other than 2 hours.

NYC Grade 7 Assessment 1
Amy's Vacation
Benchmark Papers

The response accomplishes the prompted purpose and effectively communicates the student's mathematical understanding. The student's strategy and execution meet the content (including concepts, technique, representations, and connections), thinking processes and qualitative demands of the task. Minor omissions may exist, but do not detract from the correctness of the response.

Either verbally or symbolically, the strategy used to solve the problem is stated, as is the work used to find ratios, unit rates, and partial answers to problems. Minor arithmetic errors may be present, but no errors of reasoning appear. Complete explanations are stated, based on work shown.

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The reasoning used to solve the parts of the problem may include:

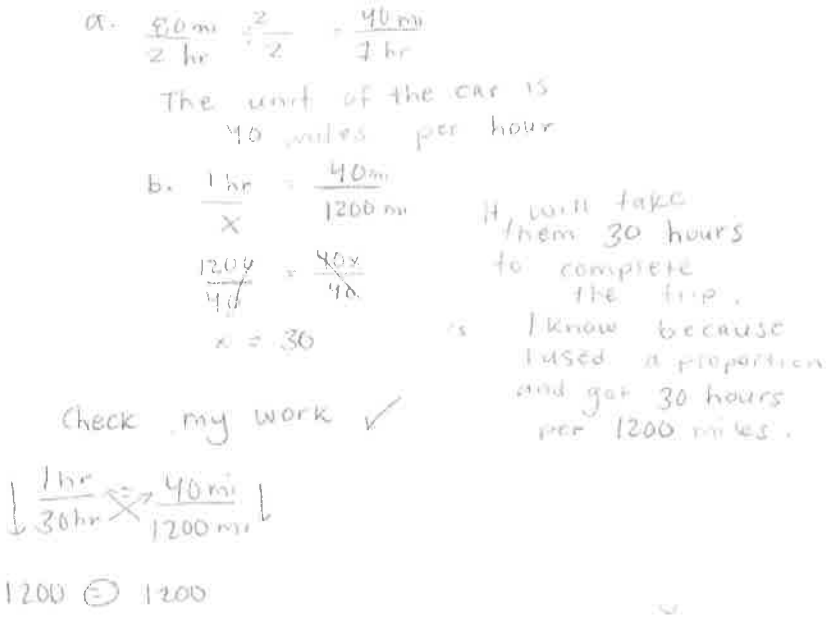
a. Indicating the 80-mile trip took two hours; scaling down the 80 mile : 2 hour rate in tabular or fraction form to 40/1 or 40 miles per hour.

b. Using a proportion or proportional reasoning (e.g., 2 hours is twice 1 hour, so I can half 80 miles (or divide 80 miles by 2) to find the unit rate.

c. Scaling up the 80 mile: 2 hours or 40 mile : 1 hour rate in tabular or fraction form to 1200 miles : 30 hours.

d. Using a proportion or proportional reasoning (e.g., 1200 miles is 40 miles times 30, so I can multiply I hour by 30.)

miles	40	400	1200
hours	1	10	30



NYC Grade 7 Assessment 1
Amy's Vacation
Benchmark Papers

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The reasoning used to solve the parts of the problem may include:

a. Indicating the 80-mile trip took some number other than 2 hours; or the distance traveled for the two-hour trip was some number other than 80 miles; scaling down in tabular or fraction form to a unit rate consistent with the number chosen.

b. Correctly using a proportion or proportional reasoning to find the unit rate, but choosing a distance other than 80 miles or a time other than 2 hours.

c. Scaling up the 80 mile : 2 hour or 40 mile : 1 hour rate in tabular or fraction form, but failing to reach or failing to stop at 1200 miles.

d. Using a proportion or proportional reasoning (e.g., 1200 miles is 80 miles times 15), but failing to multiply 2 hours by 15.

miles	40	80	120	160
hours	1	2	3	4

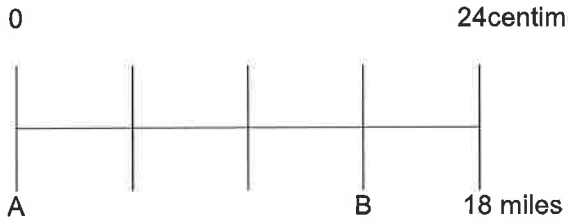
traveled 2 hours

A. unit rate is $\frac{40\text{ mi}}{1\text{ hour}}$ the unit rate needs to have a denominator of one. So the 2 was going to be the numerator so I divided 2/80 to get half.

B. Every 2 hour is 80 mi
It will take them 15 hours to get to their distination Because

15
80 | 1200
−80
400
−400
0

2. On a map of the United States, 24 centimeters represents 18 miles, and the 24 centimeter segment is divided into four equal pieces, as shown in the picture below.



a. How many centimeters represent one mile?

b. How long is the line segment between A and B in centimeters? Use mathematical reasoning to justify your response.

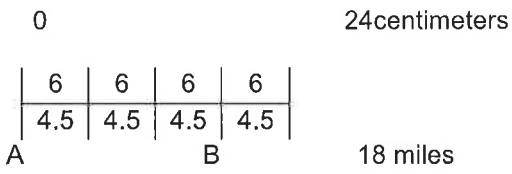
c. If A and B represent two cities, what is the actual distance between the two cities? Use mathematical reasoning to justify your response.

NYC Grade 7 Assessment 1
Map Task
Benchmark Papers

2 Points
The response demonstrates adequate evidence of the learning and strategic tools necessary to complete the prompted purpose. It may contain overlooked issues, misleading assumptions, and/or errors in execution. Evidence in the response demonstrates that the student can revise the work to accomplish the task with the help of written feedback or dialogue.

Either verbally or symbolically, the strategy used to solve each part of the problem is stated, as is the work used to find ratios, proportions, and partial answers to problems. Minor arithmetic errors may be present. Reasoning may contain incomplete, ambiguous or misrepresentative ideas. Accurate reasoning processes demonstrate the Mathematical Practices, (1) Make sense of problems and persevere in solving them and (2) Reason abstractly and quantitatively (since students need to abstract information from the problem, create a mathematical representation of the problem, and correctly work with unit rate, ratios and/or proportion). Evidence of the Mathematical Practice, (3) Construct viable arguments and critique the reasoning of others, is demonstrated by complete and accurate explanations. Evidence of the Mathematical Practice, (4) Model with mathematics, is demonstrated by representing the problem as pictorially, or with ratios and/or proportions. Evidence of the Mathematical Practice, (6) Attend to precision, can include proper use of ratio notation, proportion, and proper labeling of pictures and quantities. Evidence of the Mathematical Practice, (7) Look for and make use of structure, may be demonstrated by student recognition that parts b and c of this problem may successfully be solved with a proportion. Evidence of the Mathematical Practice, (8) Look for and express regularity in repeated reasoning, may be demonstrated by student use of the same reasoning process (repeated calculations) in both parts b and c.

The reasoning used to solve the parts of the problem may include:



a. Dividing the line segment into equal-sized pieces and reasoning from the picture, but indicating, e.g., that the 6 cm. segment represents one mile.
b. Forming the ratio 18 cm : 24 mi. or 18 mi. : 24 cm and scaling down to a denominator of 1 or dividing 18 by 24; possibly drawing a picture first and using 4.5/6; possibly using similar reasoning in part c.
c. Incorrectly forming the ratio of line segment AB to the 24 cm segment, but then correctly finding that fraction of 24, or correctly forming the ratio of line segment AB to the 24 cm segment, but then finding that fraction of 18; possibly using scaling or proportions to do so; possibly using similar reasoning in part c.
d. Correctly attempting only two parts of the problem.

a. $\frac{24\text{ mi}}{18\text{ cm}} \div \frac{18}{18} = \frac{1.\overline{3}\text{ cm}}{1\text{ mi}}$

1.3 cm represent 1 mile

b. The line segment between A and B is 4.5 cm

c. $\frac{1.3\text{ cm}}{4.5\text{ cm}} = \frac{1\text{ mi}}{x}$

$\frac{1.3x}{1.3} = \frac{4.5}{1.3}$

$x = 3.46$

The actual distance between the two cities is 3.46 miles

NYC Grade 7 Assessment 1
Map Task
Benchmark Papers

1 Point

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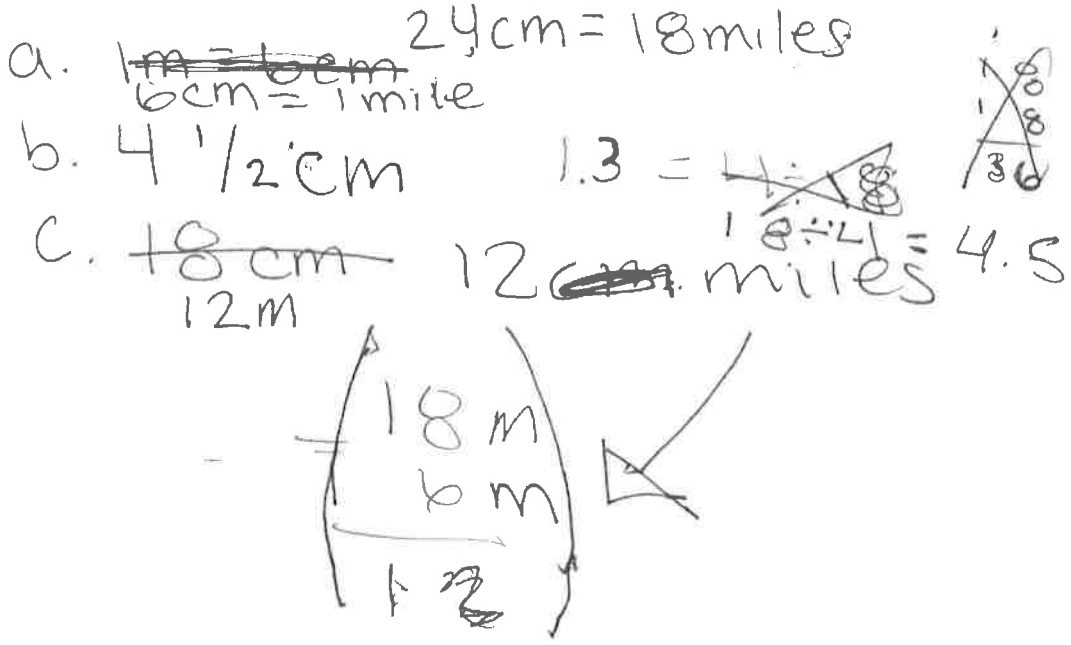
The reasoning used to solve the parts of the problem may include:

a. Dividing the line segment into equal-sized pieces and reasoning from the picture, but indicating, e.g., that the 6 cm. or the 4.5 mi. segment represents answers to several parts of the problem.

b. Forming some appropriate ratios, but failing to scale appropriately.

c. Correctly attempting only one part of the problem.



NYC Grade 7 Assessment 1
Map Task
Benchmark Papers

3 Points

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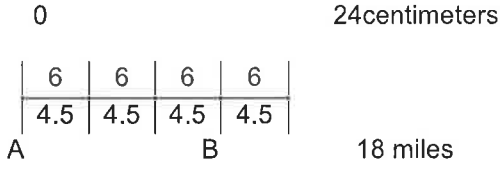
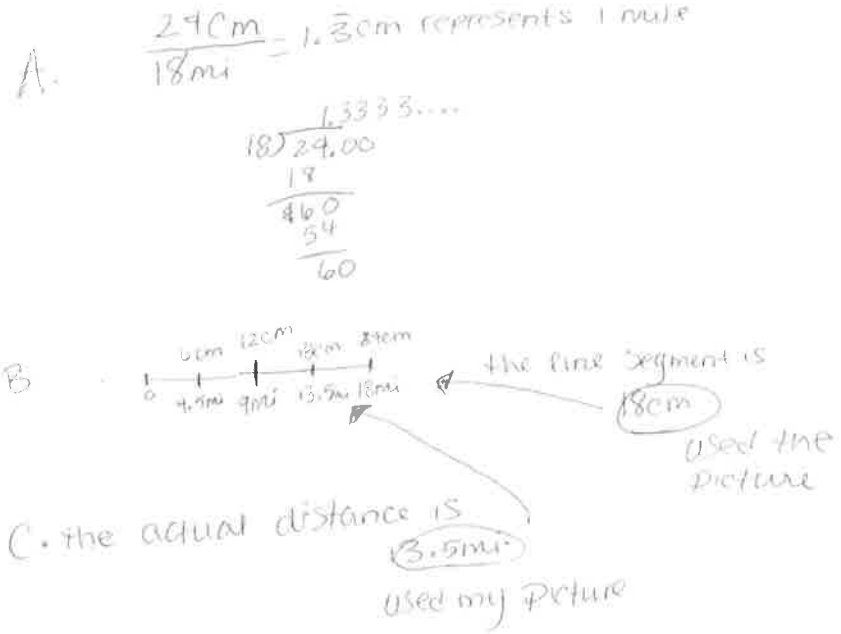
The reasoning used to solve the parts of the problem may include:



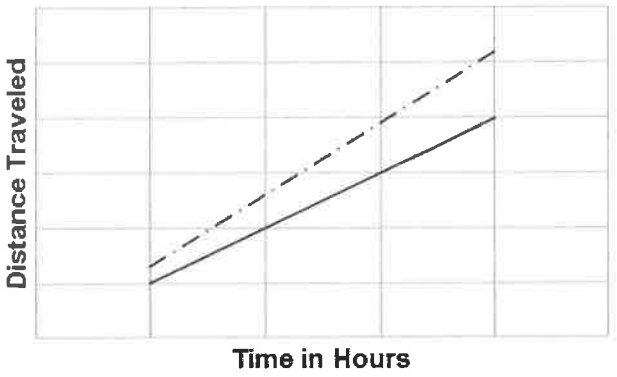
a. Dividing the line segment into equal-sized pieces and reasoning from the picture.
b. Forming the ratio 24 cm : 18 mi. and scaling down to a denominator of 1 or dividing 24 by 18; possibly drawing a picture first and using 6/4.5; possibly using similar reasoning in part c.
c. Noting that the ratio of line segment AB to the 24 cm segment is ¾, and finding ¾(24); using the proportion ¾ = x/24 then scaling 4 up to 24 and 3 up to 18 with tables or multiplication; or solving the proportion as an equation; possibly using similar reasoning in part c.



3. Jack and Jill raced cross-country on motor bikes. Jack drove 325 miles in 5 hours; Jill took 6 ½ hours to travel the same distance as Jack.

   a. Compute the unit rates that describe Jack's average driving speed and Jill's average driving speed. Show how you made your decisions.

   b. A portion of the graph of Jack and Jill's race appears below. Identify which line segment belongs to Jack and which belongs to Jill. Explain in words how you decided which line segment belongs to Jack and which belongs to Jill.



NYC Grade 7 Assessment 1
Jack and Jill's Race Task
Benchmark Papers

3 Points

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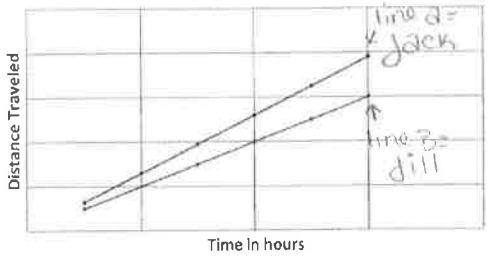
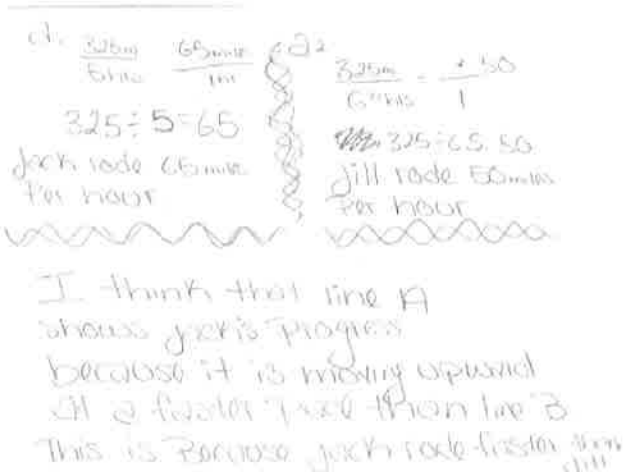
The reasoning used to solve part b of the problem may include:

a. Recognizing that the line rising more quickly must represent the faster biker.

b. Noting that, for any one or all points on the graph, those appearing on the upper line show a larger distance traveled in the same amount of time as those points on the lower line; may or may not reference that the x-coordinate represents amount of time traveled while the y-coordinate represents distance traveled.

c. Building a table of values for each biker and matching the table to the graph, possibly by choosing scales for the axes.





NYC Grade 7 Assessment 1
Jack and Jill's Race Task
Benchmark Papers

1 Point

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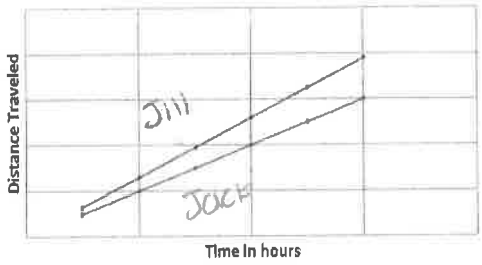
The reasoning used to solve the parts of the problem may include:

a. Assuming proportionality rather than trying to find unit rate.
b. Reference to the length of the segments rather than distance and time.
c. Assuming the upper line suggests more time rather than a larger distance when compared to time.



a $\frac{5 \text{ hours}}{325 \text{ miles}} = \frac{6\frac{1}{2} \text{ hours}}{x}$

$\frac{5}{5}x = 325 \cdot 6\frac{1}{2} = 2112.5$

$x = 422.5$

b = I think the line at the bottom is Jack and the top is Jill because it took Jill $6\frac{1}{2}$ hours just to go as far as Jack while it took Jack 5 hours to go 325 miles

325

422.5
5 | 2112.5
-10
12
10
25
25
00

NYC Grade 7 Assessment 1
Jack and Jill's Race Task
Benchmark Papers

2 Points

The response demonstrates adequate evidence of the learning and strategic tools necessary to complete the prompted purpose. It may contain overlooked issues, misleading assumptions, and/or errors in execution. Evidence in the response demonstrates that the student can revise the work to accomplish the task with the help of written feedback or dialogue.

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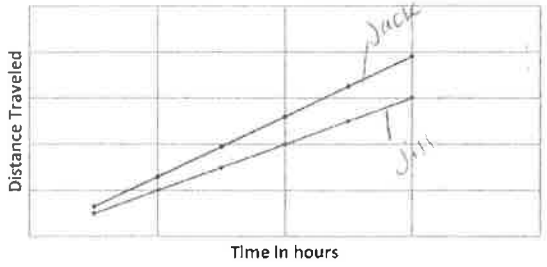
The reasoning used to solve part b of the problem may include:

a. Recognizing that the top line must represent the faster biker, but failing to note that the top line is rising more quickly.

b. Generally noting that the points appearing on the upper line show a larger distance traveled without noting that the larger distance is occurring in the same amount of time.

c. Building a table of values for each biker and matching the table to the graph, possibly by choosing scales for the axes; scales may be inappropriately chosen or tables of values may be arbitrary.



a. i $\frac{325\text{ mi}}{5\text{ hr}} \div \frac{5}{5} = \frac{65}{1\text{ hr}}$

Jack's average speed is 65 mi/hr

ii. $\frac{325\text{ mi}}{6.5\text{ hr}} \div 6.5 = \frac{50}{1\text{ hr}}$

Jill's average driving speed is 50 mi/hr

b. ii I made my decision because Jack drives at a higher rate per hour

4. Reynaldo is planning to drive from New York to San Francisco in his car. Reynaldo started to fill out the table below showing how far in miles he can travel for each gallon of gas he uses.

Gallons	2	4		8	10	12
Miles	56		168	224		

Use the information in Reynaldo's table to answer the questions below.

a. Complete the table for Reynaldo. Assume the relationship in the table is proportional.

b. Based on the table, how many miles per gallon did Reynaldo's car get? Explain your reasoning in words.

c. Write an equation that Reynaldo can use to find the distance (d) he can drive on any number of gallons of gas (g).

d. When Reynaldo's tank is full, it holds 20 gallons. How far can Reynaldo drive on a full tank of gas?

NYC Grade 7 Assessment 1
Reynaldo's Drive Task
Benchmark Papers

The response accomplishes the prompted purpose and effectively communicates the student's mathematical understanding. The student's strategy and execution meet the content (including concepts, technique, representations, and connections), thinking processes and qualitative demands of the task. Minor omissions may exist, but do not detract from the correctness of the response.

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The reasoning used to solve the parts of the problem may include:

a. Indicating that the unit rate can be multiplied by the number of gallons to find the distance, and using that process.

b. Using a proportion or proportional reasoning (e.g., 2 times 10 equals 20, so I can multiply 56 by 10 to find distance).

c. Extending the table of values.

Gallons	2	4	6	8	10	12
Miles	56	112	168	224	280	336

28 because 2 gallon equal 56 miles
so 1 gallon of it is $\frac{1}{28}$.

$D = 28g$

I double $\frac{70}{280}$ I divide it which is $\frac{20}{80}$.

NYC Grade 7 Assessment 1
Reynaldo's Drive Task
Benchmark Papers

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The reasoning used to solve the parts of the problem may include:

a. Indicating that the unit rate can be multiplied by the number of gallons to find the distance, and using that process, but using an incorrect unit rate or number of gallons.

b. Using a proportion or proportional reasoning incorrectly (e.g., 20 gallons is 2 times 10, so I can multiply 10 by 10 to find distance).

c. Extending the table of values, but failing to recognize the need to stop at 20 gallons.

Gallons	2	4	6	8	10	12
Miles	56	112	168	224	280	336

b. $\frac{56}{2} = \frac{2}{2} = \frac{28 \text{ mi}}{1 \text{ gal}}$
Reynaldo used 28 miles per gallon

c. a constant rate of 28 miles per gallon
$d = 28g$

d. $\frac{1 \text{ gal}}{20 \text{ gal}} = \frac{28 \text{ mi}}{x}$ Reynaldo can drive 560 miles on a full tank

$\frac{1x}{1} = \frac{560}{1}$

$x = 560$

NYC Grade 7 Assessment 1
Reynaldo's Drive Task
Benchmark Papers

The response demonstrates some evidence of mathematical knowledge that is appropriate to the intent of the prompted purpose. An effort was made to accomplish the task, but with little success. Evidence in the response demonstrates that, with instruction, the student can revise the work to accomplish the task.

Some evidence of reasoning is demonstrated either verbally or symbolically, is often based on misleading assumptions, and/or contains errors in execution. Some work is used to find ratio, unit rates, proportionality and equation or partial answers to portions of the task are evident. Explanations are incorrect, incomplete or not based on work shown. Accurate reasoning processes demonstrate the Mathematical Practices (1) Make sense of problems and persevere in solving them, and (2) Reason abstractly and quantitatively (since students need to abstract information from the problem, create a mathematical representation of the problem, and correctly work both with unit rate/constant of proportionality). Evidence of the Mathematical Practice, (3) Construct viable arguments and critique the reasoning of others, is demonstrated by complete and accurate explanations. Evidence of the Mathematical Practice, (4) Model with mathematics, is demonstrated by the linear equation shown in part c. Evidence of the Mathematical Practice, (6) Attend to precision, can include proper use of ratio and/or proportion notation, proper symbolism and proper labeling.

The reasoning used to solve the parts of the problem may include:

a. No attempt at mathematical reasoning to respond to part b.

b. Some attempt to scale, but failure to maintain the ratio, typically by reverting to addition.

c. Failure to attempt at least two parts of the problem.

(a)

gallons	2	4	6	8	10	12
Miles	56	112	168	224	280	336

(b) He used the number 56.

(c) Keep adding 2 for the gallons and keep adding 56 for the miles