

Tennessee Comprehensive Assessment Program

TCAP/CRA 2013



4

Anchor Set

Grade 4 – Redwood Tree Task

SECURE MATERIAL - Reader Name: _____

Tennessee Comprehensive Assessment Program

Part 2: Constructed Response Assessment

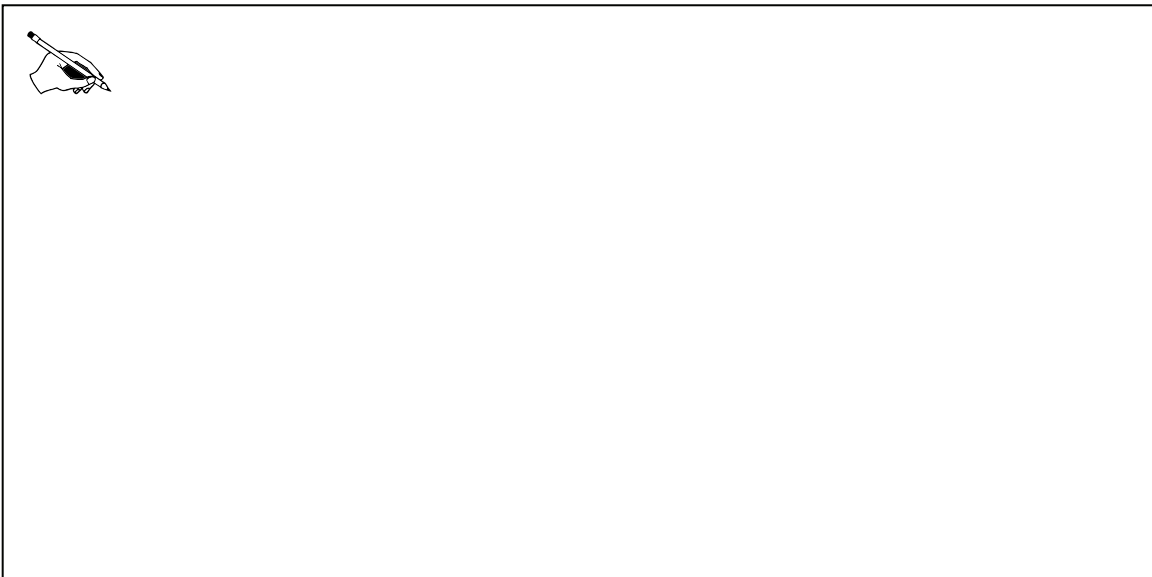
Redwood Tree Task

Howard read that a redwood tree measures 63 feet tall. Howard tried to picture the height of the redwood tree by comparing it to the 7-foot maple tree in his front yard.

- a. How many times taller is the redwood than the maple?

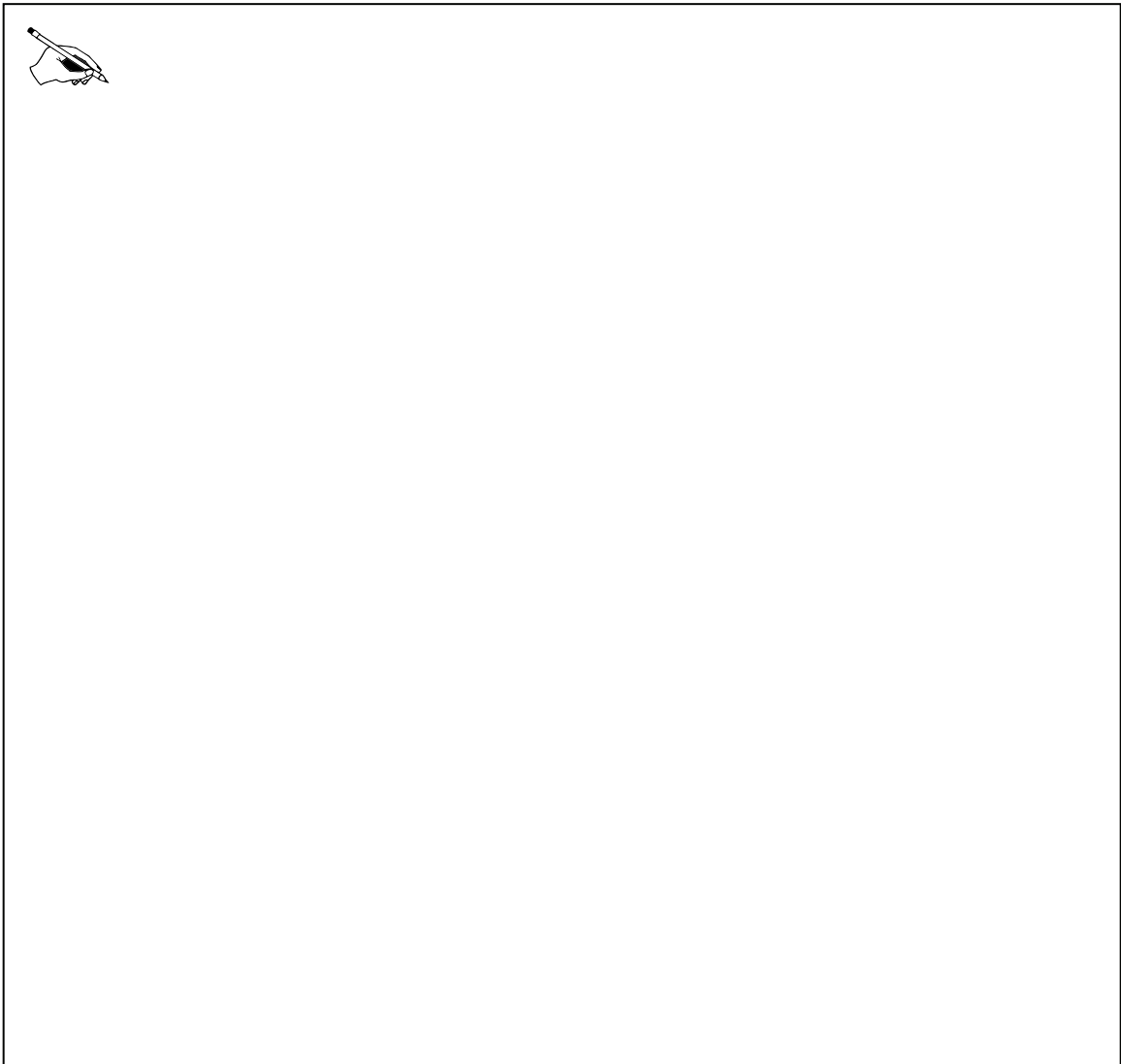
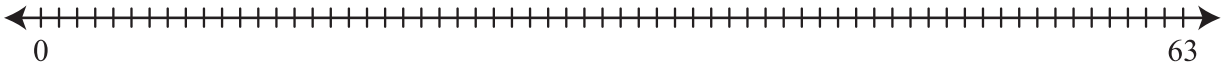


- b. Explain with words and drawings how Howard can use both multiplication and division equations to find how many times taller the redwood is than the maple.



Part 2: Constructed Response Assessment

- c. How could the number line be used to help Howard find how many times taller the redwood is than the maple? Use the number line and words to explain your thinking.



Scoring Guide

The CCSS for Mathematical Content (2 points)

- 4.OA.A.1 Explains the multiplication equation as the comparison of the maple tree to the redwood tree. The student may do this by: _____
- Indicating that 63 (redwood tree) is a multiple of 7 (maple tree),
or
 - Describing, with words or a diagram that the maple tree would fit multiple times into the height of the redwood. **(1 Point)**
- 4.OA.A.2 Determines that the redwood is 9 times taller than the maple. **(1 Point)** _____

The CCSS for Mathematical Practice (3 points)

- MP4 Models the comparative relationship of the trees with a diagram. Students may do this by: _____
- expressing that the redwood tree is taller than the maple with a picture and relating the multiplication and/or division equation to the diagram
or
 - indicating on the number line the relationship between the maple tree and the redwood tree. The maple tree is represented by the interval of 7 and the redwood tree is represented by the total length of the number line. **(1 Point)**
- (MP4: Model with mathematics.)
- MP6 Accurately represents in words or on the number line 9 multiples of 7. **(1 Point)** _____
- (MP6: Attend to precision.)
- MP7 Explicitly connects, through words and diagrams, the multiplication and division equations displayed in part b. **(1 Point)** _____
- (MP7: Look for and make use of structure.)

TOTAL POINTS: 5

The CCSS for Mathematical Content Addressed In This Task

Use the four operations with whole numbers to solve problems.

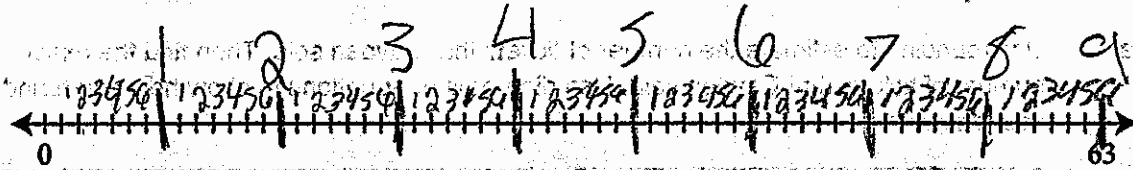
- | | |
|----------|--|
| 4.OA.A.1 | Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. |
| 4.OA.A.2 | Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. |


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 type indicates Mathematical Practices not addressed in this assessment.

- c. How could the number line be used to help Howard find how many times taller the redwood is than the maple? Use the number line and words to explain your thinking.



 The timeline helps
 you to find how many times
 higher the redwood is than the
 maple because every 7th slash
 put a mark then when you fill
 "all" the 7th slash count them
 and you end up with 9.
 The first mark you put is
 how tall the maple is and
 think of a redwood as 9
 maples on top of each other

Guide 1

Litho 0086

Total Content Points: 2 (4.OA.A.1, 4.OA.A.2)

Total Practice Points: 3 (MP4, MP6, MP7)

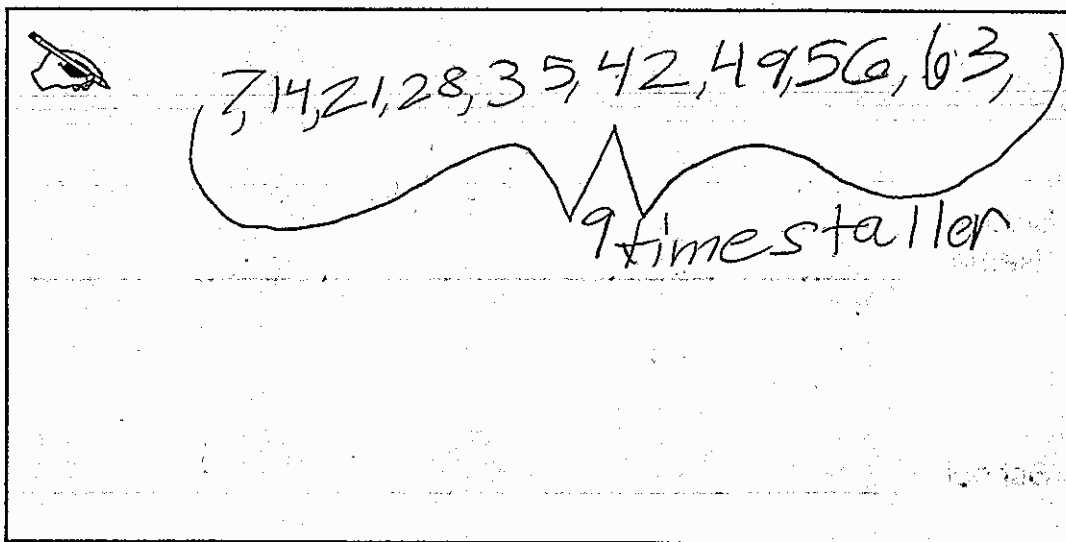
In Part A, the student indicates that 63 is a multiple of 7 both through the use of a multiplication equation that uses 7 as a factor and 63 as the product ($7 \times 9 = 63$ ft) and a repeated addition equation totaling 63 (4.OA.A.1). In Part A, the student determines the redwood to be 9 times taller than the maple (4.OA.A.2). The student uses the number line in Part C to indicate the relationship between the maple and the redwood by marking the 7th interval (MP4). The student then continues to mark off every 7 intervals beyond that point, accurately representing 9 multiples of 7 (MP6). In Part B, the student provides both words and a diagram to explicitly connect the multiplication and division equations. The student's explanation that " $63 \div 7 = 9$ and you can check your quotient [quotient] by multipl[y]ing $9 \times 7 = 63$ " adequately suggests an understanding of the inverse relationship of both operations (MP7).

Total Awarded Points: 5 out of 5

1. Redwood Tree Task

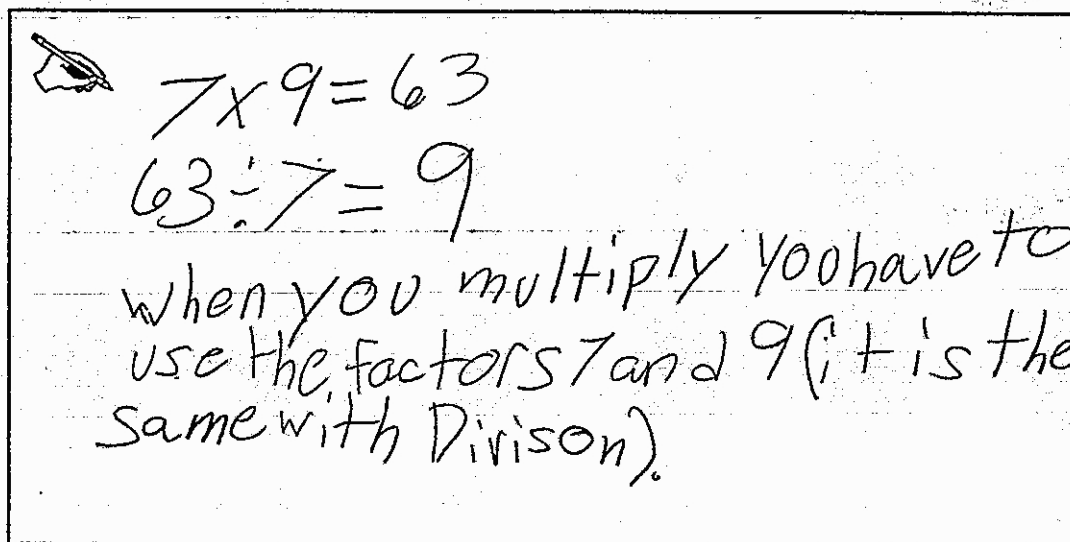
Howard read that a redwood tree measures 63 feet tall. Howard tried to picture the height of the redwood tree by comparing it to the 7-foot maple tree in his front yard.

- a. How many times taller is the redwood than the maple?



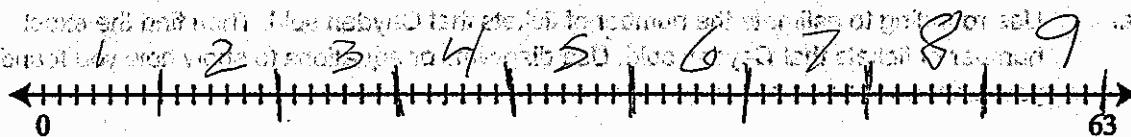
7, 14, 21, 28, 35, 42, 49, 56, 63,
9 times taller


- b. Explain with words and drawings how Howard can use both multiplication and division equations to find how many times taller the redwood is than the maple.



$7 \times 9 = 63$
 $63 \div 7 = 9$
 when you multiply you have to use the factors 7 and 9 (it is the same with Divison).

c. How could the number line be used to help Howard find how many times taller the redwood is than the maple? Use the number line and words to explain your thinking.



 Their are 9 units of 7
So the red wood is 9 times
bigger than the maple

Guide 2

Litho 0102

Total Content Points: 2 (4.OA.A.1, 4.OA.A.2)

Total Practice Points: 2 (MP4, MP6)

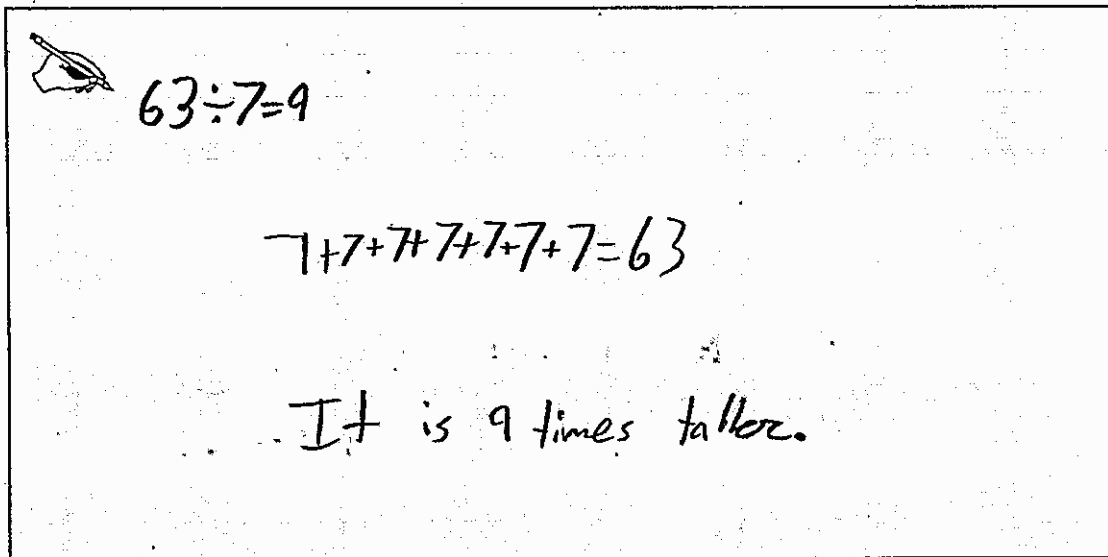
The student indicates that 63 is a multiple of 7 both through a list in Part A of 9 values of 7, ending in 63 (7, 14, 21, 28, 35, 42, 49, 56, 63), and through the use of a multiplication equation in Part B that uses 7 as a factor and 63 as the product ($7 \times 9 = 63$) (4.OA.A.1). In Part A, the student determines the redwood to be 9 times taller than the maple (4.OA.A.2). The student uses the number line in Part C to indicate the relationship between the maple and the redwood by marking the 7th interval (MP4), and continues to mark off every 7 intervals beyond that point, accurately representing 9 multiples of 7 (MP6). In Part B, the student does not provide the required diagram to explicitly connect the multiplication and division equations, despite giving an adequate description (no credit for MP7).


Total Awarded Points: 4 out of 5

1. Redwood Tree Task

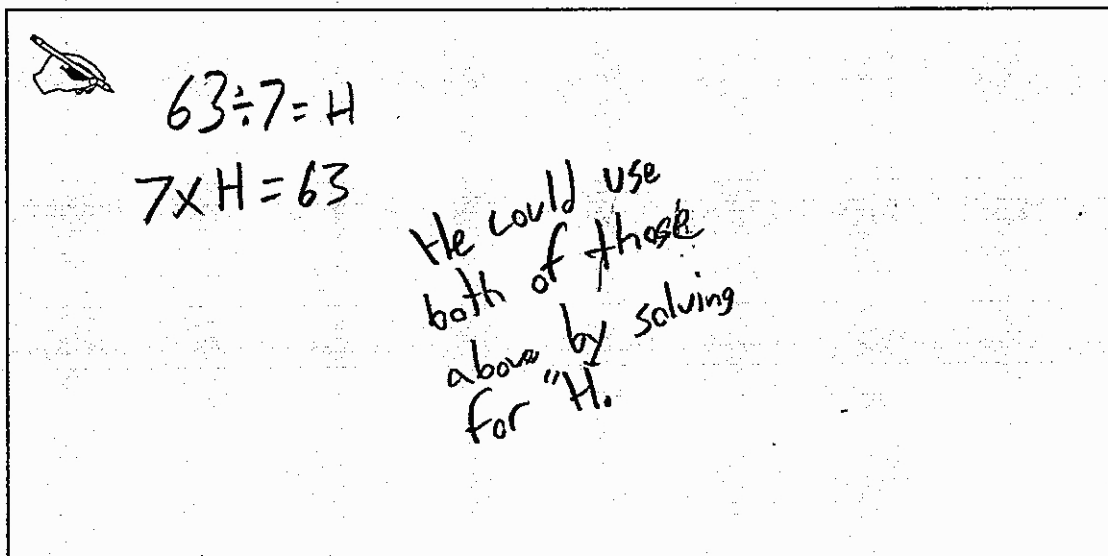
Howard read that a redwood tree measures 63 feet tall. Howard tried to picture the height of the redwood tree by comparing it to the 7-foot maple tree in his front yard.


- a. How many times taller is the redwood than the maple?



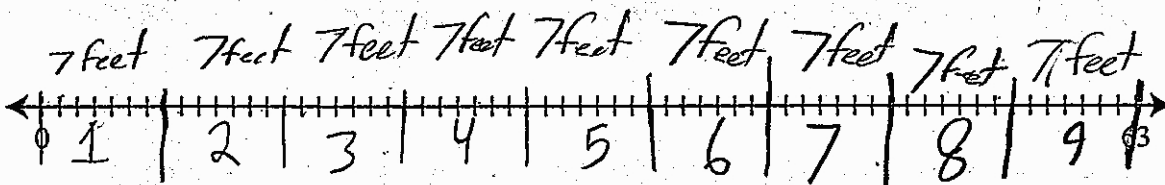

 $63 \div 7 = 9$
 $7 + 7 + 7 + 7 + 7 + 7 = 63$
 It is 9 times taller.


- b. Explain with words and drawings how Howard can use both multiplication and division equations to find how many times taller the redwood is than the maple.




 $63 \div 7 = H$
 $7 \times H = 63$
 He could use both of these above by solving for "H".

- c. How could the number line be used to help Howard find how many times taller the redwood is than the maple? Use the number line and words to explain your thinking.



 On the number line I counted up intill 7 then number it 1 and I did it repetitively.

Guide 3

Litho 0148

Total Content Points: 2 (4.OA.A.1, 4.OA.A.2)

Total Practice Points: 2 (MP4, MP6)

The student indicates that 63 is a multiple of 7 through the use of a multiplication equation in Part B that uses 7 as a factor and 63 as the product ($7 \times H = 63$) (4.OA.A.1). In Part A, the student determines the redwood to be 9 times taller than the maple (4.OA.A.2). The student uses the number line in Part C to indicate the relationship between the maple and the redwood by marking the 7th interval (MP4). The student then continues to mark off every 7 intervals beyond that point, accurately representing 9 multiples of 7, despite the incorrect addition shown in Part A (MP6). In Part B, the student provides neither the required diagram nor an adequate description to explicitly connect the multiplication and division equations (no credit for MP7).

Total Awarded Points: 4 out of 5

1. Redwood Tree Task

Howard read that a redwood tree measures 63 feet tall. Howard tried to picture the height of the redwood tree by comparing it to the 7-foot maple tree in his front yard.

- a. How many times taller is the redwood than the maple?

The redwood is 9 times taller than the maple.

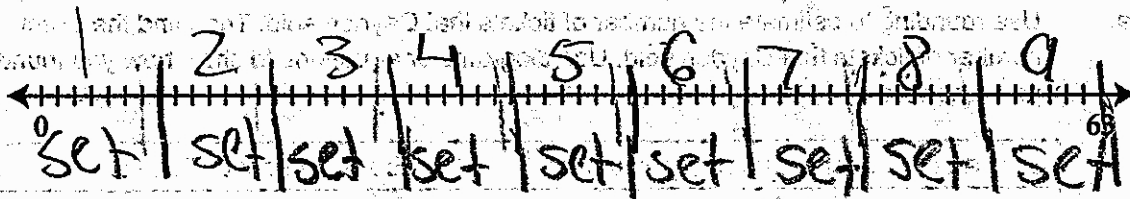
- b. Explain with words and drawings how Howard can use both multiplication and division equations to find how many times taller the redwood is than the maple.


He could divide $63 \div 7$ because it says times taller and times means \times . Taller means to subtract or divide. In this case it means divide, $63 \div 7 = 9$.

separate in groups of 7.

9 groups in all

- c. How could the number line be used to help Howard find how many times taller the redwood is than the maple? Use the number line and words to explain your thinking.



 I counted seven lines then I put a line of the seventh line. There are 9 sections. There are 9 lines. Representing $63 \div 7 = 9$

$$\begin{array}{r}
 7 \\
 7 \overline{) 63} \\
 \underline{63} \\
 0
 \end{array}$$

Guide 4 Litho 0101

Total Content Points: 1 (4.OA.A.2)

Total Practice Points: 2 (MP4, MP6)


The student neither indicates that 63 is a multiple of 7, nor provides an adequate explanation or equation to show that the comparison of heights can be represented as a multiplication equation (no credit for 4.OA.A.1). In Part A, the student determines the redwood to be 9 times taller than the maple (4.OA.A.2). The student uses the number line in Part C to indicate the relationship between the maple and the redwood by marking the 7th interval (MP4). The student then continues to mark off every 7 intervals beyond that point, accurately representing 9 multiples of 7 (MP6). In Part B, the student does not provide a multiplication equation (no credit for MP7).

Total Awarded Points: 3 out of 5


1. Redwood Tree Task

Howard read that a redwood tree measures 63 feet tall. Howard tried to picture the height of the redwood tree by comparing it to the 7-foot maple tree in his front yard.

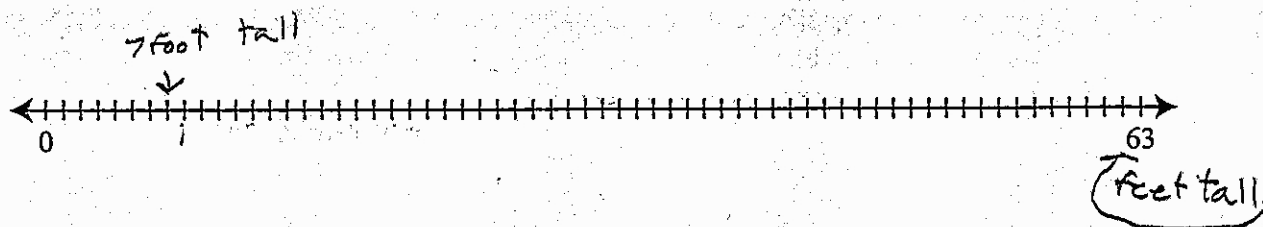
- a. How many times taller is the redwood than the maple?


$$63 - 7 = 56$$

- b. Explain with words and drawings how Howard can use both multiplication and division equations to find how many times taller the redwood is than the maple.


$$63 \div 7 = 9$$
$$9 \times 7 = 63$$

- c. How could the number line be used to help Howard find how many times taller the redwood is than the maple? Use the number line and words to explain your thinking.



You can use the number line because if you count 7 lines you get 7 feet, and there are 63 as total. Like 63 feet tall so there are 56 left.

Guide 5

Litho 0164

Total Content Points: 2 (4.OA.A.1, 4.OA.A.2)

Total Practice Points: 1 (MP4)


The student indicates that 63 is a multiple of 7 through the use of a multiplication equation in Part B that uses 7 as a factor and 63 as the product ($9 \times 7 = 63$) (4.OA.A.1). In Part B, though the student does not explicitly state that the redwood is 9 times taller than the maple, it is clear that this fact has been determined through the inclusion of equations that use 63, given in the prompt as the height of the redwood, and 7, given in the prompt as the height of the maple, with 9 being determined as the other value (e.g., $63 \div 7 = 9$, $9 \times 7 = 63$) (4.OA.A.2). The student uses the number line in Part C to indicate the relationship between the maple and the redwood by marking the 7th interval (MP4). The student does not represent in words or on the number line 9 multiples of 7 (no credit for MP6). In Part B, the student provides neither the required diagram nor any attempt at a description to explicitly connect the multiplication and division equations (no credit for MP7).

Total Awarded Points: 3 out of 5


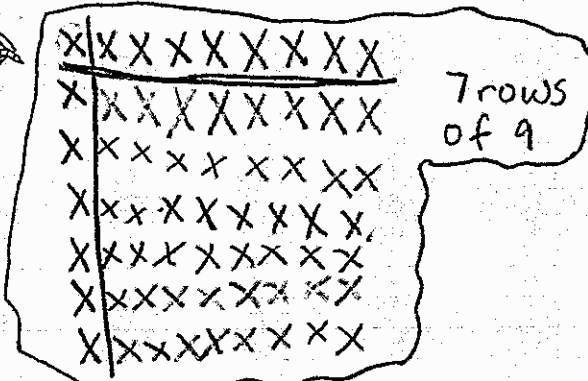
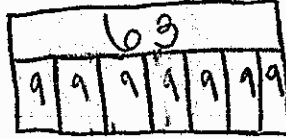
1. Redwood Tree Task

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- a. How many times taller is the redwood than the maple?

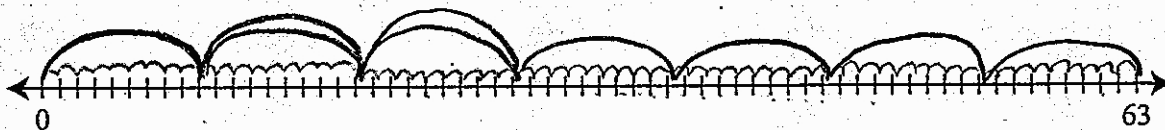
 The redwood tree is 9 times taller than his 7-foot tall maple tree.


- b. Explain with words and drawings how Howard can use both multiplication and division equations to find how many times taller the redwood is than the maple.

If you do $63 \div 7$, you get 9. You are dividing and you also can do the vice-versa, $7 \times 9 = 63$.

- c. How could the number line be used to help Howard find how many times taller the redwood is than the maple? Use the number line and words to explain your thinking.



 The number line can help him find the equation he needs to find for how many times taller the redwood is compared to his 7-foot tall maple tree.

Guide 6

Litho 0119

Total Content Points: 2 (4.OA.A.1, 4.OA.A.2)

Total Practice Points: 1 (MP7)

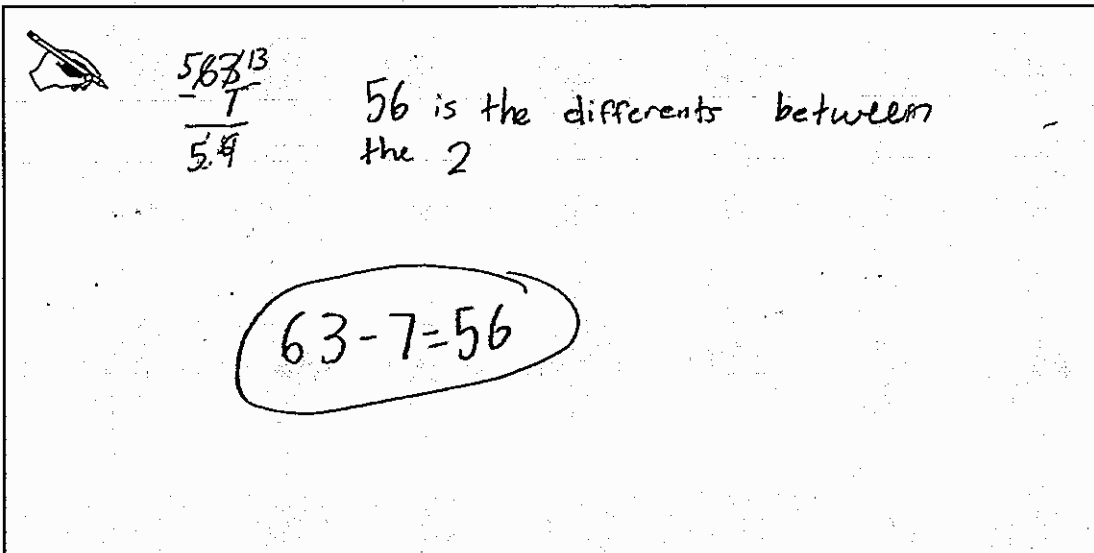
The student indicates that 63 is a multiple of 7 through the use of a multiplication equation in Part B that uses 7 as a factor and 63 as the product ($7 \times 9 = 63$) (4.OA.A.1). In Part A, the student determines the redwood to be 9 times taller than the maple (4.OA.A.2). The student neither provides an adequate diagram in Part B to illustrate that the redwood is taller than the maple nor marks the 7th interval on the number line in Part C to indicate the relationship between the redwood and the maple (no credit for MP4). The student does not represent in words or on the number line 9 multiples of 7, instead marking off 7 multiples of 9 (no credit for MP6). In Part B, the student provides both words and a diagram to explicitly connect the multiplication and division equations, as the student's explanation that "If you do $63 \div 7$, you get 9. You are dividing and you also can do the vise-versa, $7 \times 9 = 63$ " adequately suggests an understanding of the inverse relationship of both operations (MP7).


Total Awarded Points: 3 out of 5

1. Redwood Tree Task

Howard read that a redwood tree measures 63 feet tall. Howard tried to picture the height of the redwood tree by comparing it to the 7-foot maple tree in his front yard.

- a. How many times taller is the redwood than the maple?

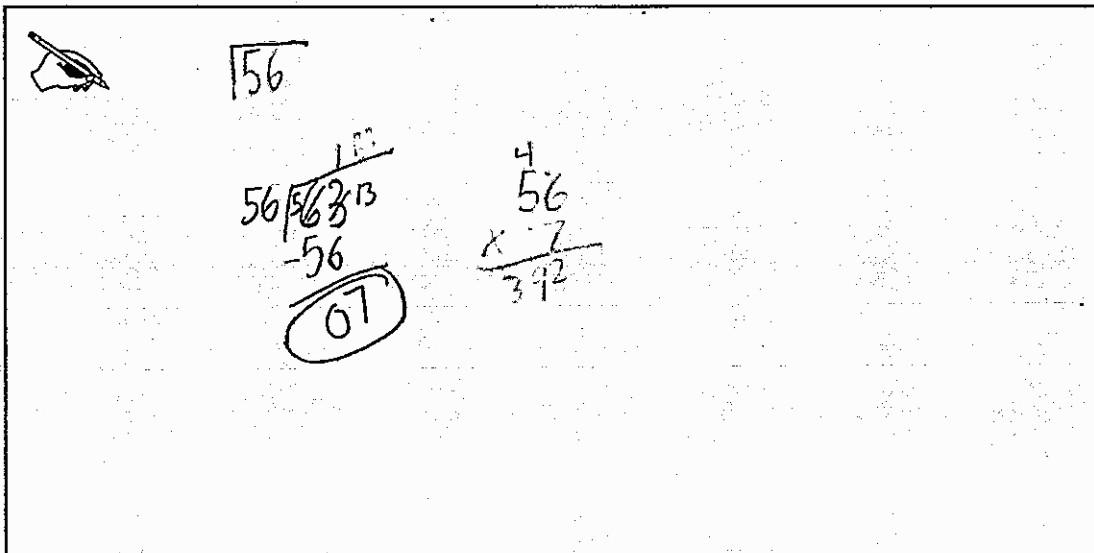





$$\begin{array}{r} 63 \\ - 7 \\ \hline 56 \end{array}$$
 56 is the difference between the 2

$63 - 7 = 56$

- b. Explain with words and drawings how Howard can use both multiplication and division equations to find how many times taller the redwood is than the maple.



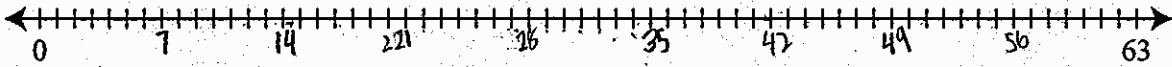



$$\overline{)56}$$

$$\begin{array}{r} 8 \\ 56 \overline{)63} \\ -56 \\ \hline 07 \end{array}$$

$$\begin{array}{r} 8 \\ \times 7 \\ \hline 56 \end{array}$$

- c. How could the number line be used to help Howard find how many times taller the redwood is than the maple? Use the number line and words to explain your thinking.



 You add 7 each time to get to 63 and it goes to 56 before it get to 63 and you could subtract 7 from 63 and get 56.

Guide 7

Litho 0037

Total Content Points: 0

Total Practice Points: 2 (MP4, MP6)

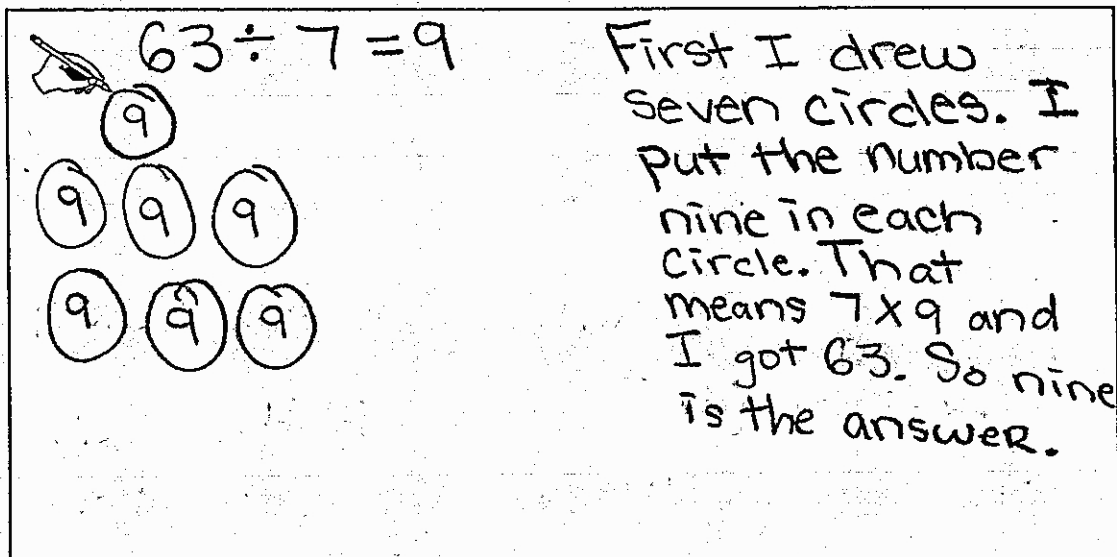
The student neither indicates that 63 is a multiple of 7 nor provides a diagram to illustrate or description to explain that the maple tree would fit multiple times into the height of the redwood (no credit for 4.OA.A.1). No evidence is provided of the student determining that the redwood is 9 times taller than the maple (no credit for 4.OA.A.2). The student uses the number line in Part C to indicate the relationship between the maple and the redwood by marking the 7th interval (MP4). The student then continues to mark off every 7 intervals beyond that point, accurately representing 9 multiples of 7 (MP6). In Part B, the student provides neither the required diagram nor any attempt at a description to explicitly connect the multiplication and division equations, and does not use the correct multiplication and division equations to represent the problem (no credit for MP7).

Total Awarded Points: 2 out of 5

1. Redwood Tree Task

Howard read that a redwood tree measures 63 feet tall. Howard tried to picture the height of the redwood tree by comparing it to the 7-foot maple tree in his front yard.

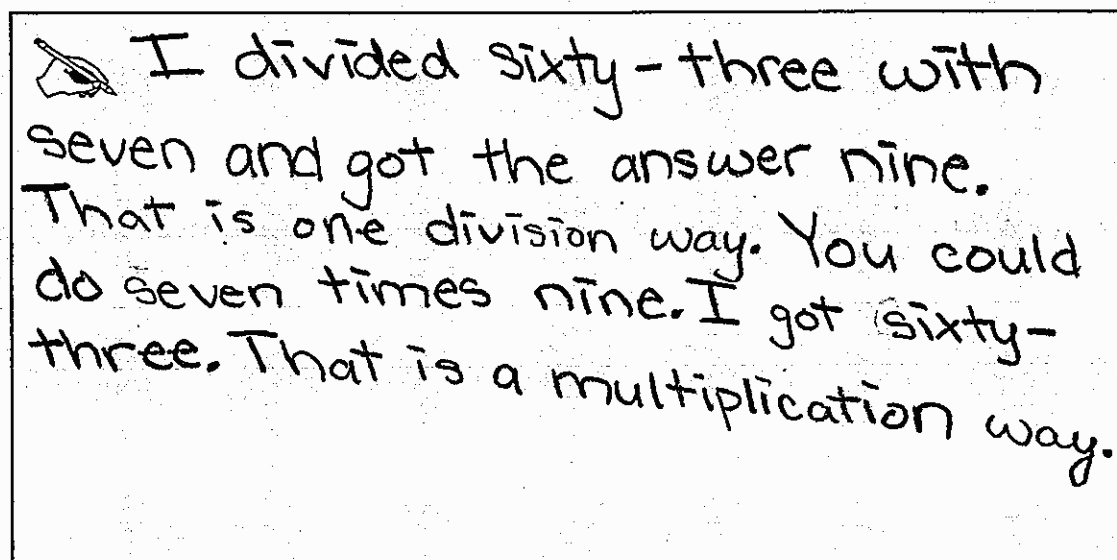
- a. How many times taller is the redwood than the maple?



63 ÷ 7 = 9

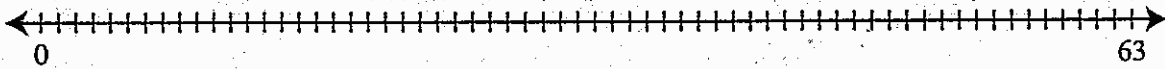
First I drew seven circles. I put the number nine in each circle. That means 7×9 and I got 63. So nine is the answer.


- b. Explain with words and drawings how Howard can use both multiplication and division equations to find how many times taller the redwood is than the maple.



I divided sixty-three with seven and got the answer nine. That is one division way. You could do seven times nine. I got sixty-three. That is a multiplication way.

- c. How could the number line be used to help Howard find how many times taller the redwood is than the maple? Use the number line and words to explain your thinking.



 You could divide the number line up seven because that is half of sixty-three. So you could do sixty-three divided by seven. Your answer is nine.

Guide 8

Litho 0139

Total Content Points: 2 (4.OA.A.1, 4.OA.A.2)

Total Practice Points: 0

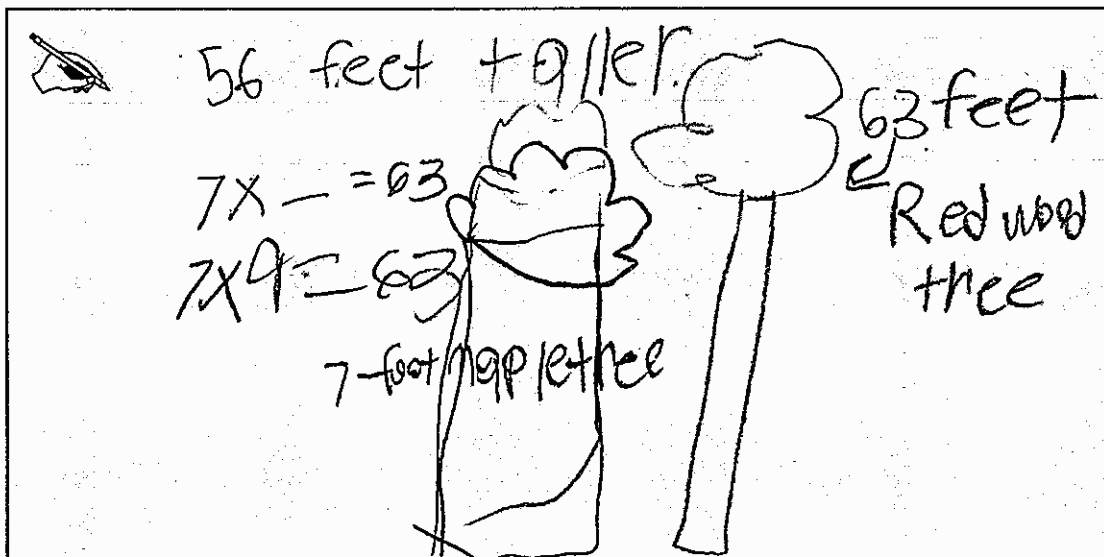
The student indicates that 63 is a multiple of 7 through the use of a multiplication expression in Part A that uses 7 as a factor and 63 as the product (“That means 7×9 and I got 63.”) (4.OA.A.1). In Part A, the student determines the redwood to be 9 times taller than the maple (4.OA.A.2). The student neither provides a diagram in Part B that illustrates that the redwood is taller than the maple nor marks the 7th interval on the number line in Part C to indicate the relationship between the redwood and the maple (no credit for MP4). The student does not represent in words or on the number line 9 multiples of 7 (no credit for MP6). In Part B, the student provides neither the required diagram nor an adequate description to explicitly connect the multiplication and division equations (no credit for MP7).

Total Awarded Points: 2 out of 5

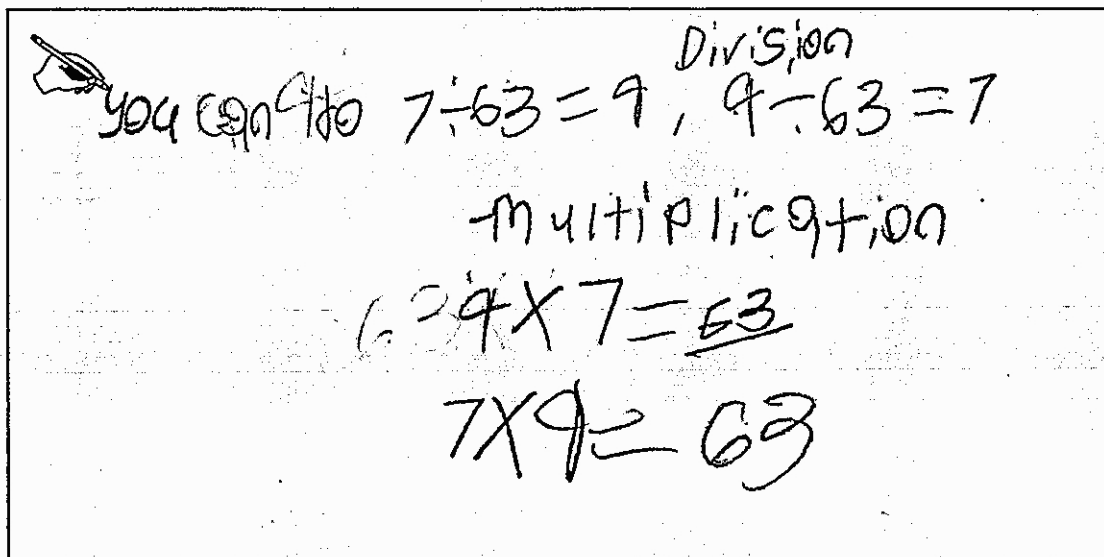
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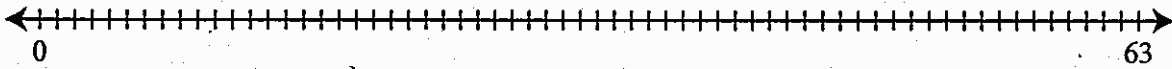
- a. How many times taller is the redwood than the maple?




- b. Explain with words and drawings how Howard can use both multiplication and division equations to find how many times taller the redwood is than the maple.



- c. How could the number line be used to help Howard find how many times taller the redwood is than the maple? Use the number line and words to explain your thinking.



 The number line would help you by knowing how tall the trees are like the maple tree it is 7 foot tall the number line would show the length.

Guide 9

Litho 0031

Total Content Points: 2 (4.OA.A.1, 4.OA.A.2)

Total Practice Points: 0

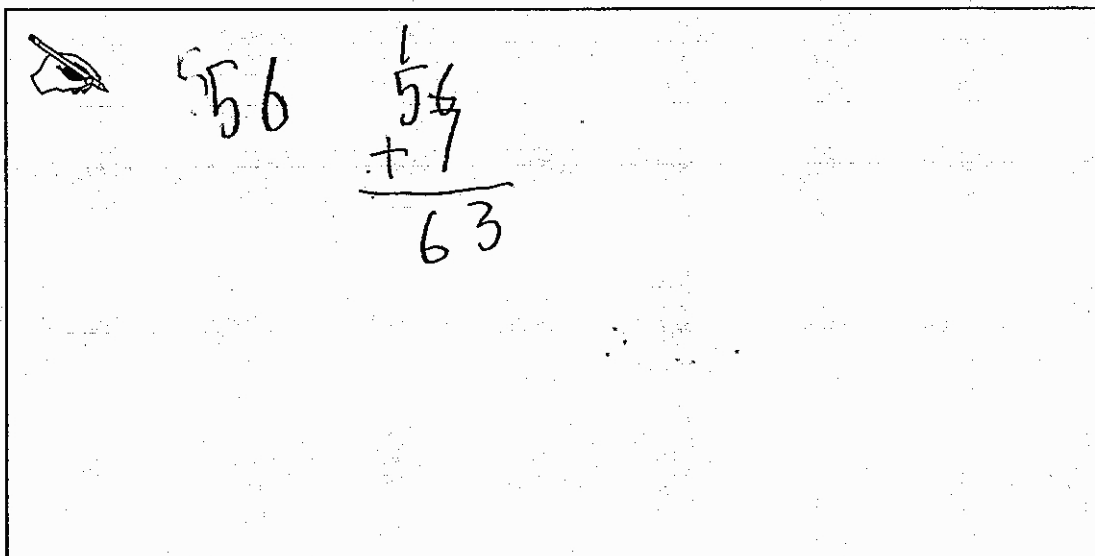
The student indicates that 63 is a multiple of 7 through the use of a multiplication equation in Part A that uses 7 as a factor and 63 as the product ($7 \times 9 = 63$) (4.OA.A.1). In Part A, though the student does not explicitly state that the redwood is 9 times taller than the maple, the student has clearly determined this answer through the inclusion of equations that use the height of the redwood given in the prompt, 63, and the height of the maple given in the prompt, 7, with 9 being determined as the other value (e.g., $7 \times _ = 63$, $7 \times 9 = 63$) (4.OA.A.2). The student neither provides an adequate diagram to clearly depict the multiplicative relationship between the height of the redwood and the maple nor marks the 7th interval on the number line in Part C to indicate the relationship between the redwood and the maple (no credit for MP4). The student does not represent in words or on the number line 9 multiples of 7 (no credit for MP6). In Part B, the student provides neither the required diagram nor an adequate description to explicitly connect the multiplication and division equations (no credit for MP7).

Total Awarded Points: 2 out of 5

1. Redwood Tree Task

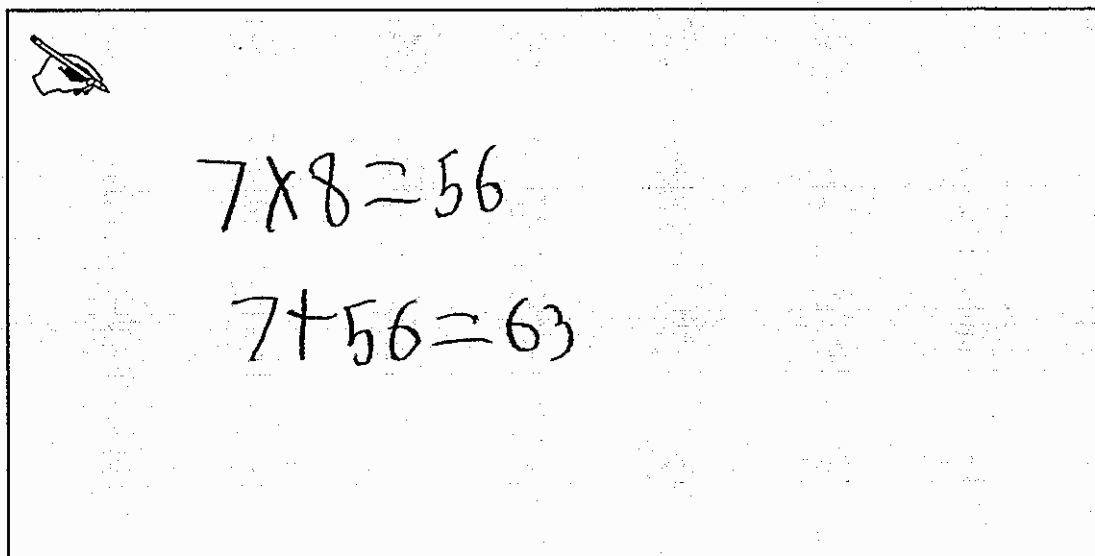
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- a. How many times taller is the redwood than the maple?



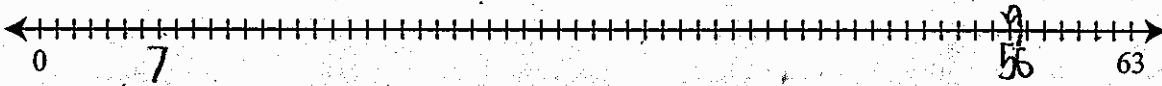
A hand-drawn diagram and arithmetic. On the left, a hand is shown holding a pencil. To the right, the number 56 is written. Further right, a vertical division problem is shown: 56 divided by 7 equals 8. The 7 is written to the left of the 56, and the 8 is written above the 6. A horizontal line is drawn under the 56, and the 63 is written below it, indicating a remainder of 63.

- b. Explain with words and drawings how Howard can use both multiplication and division equations to find how many times taller the redwood is than the maple.



A hand-drawn diagram showing two equations. On the left, a hand is shown holding a pencil. To the right, the equation $7 \times 8 = 56$ is written. Below it, the equation $7 + 56 = 63$ is written.

- c. How could the number line be used to help Howard find how many times taller the redwood is than the maple? Use the number line and words to explain your thinking.



$7 + 56 = 63$

Guide 10

Litho 0046

Total Content Points: 0

Total Practice Points: 1 (MP4)

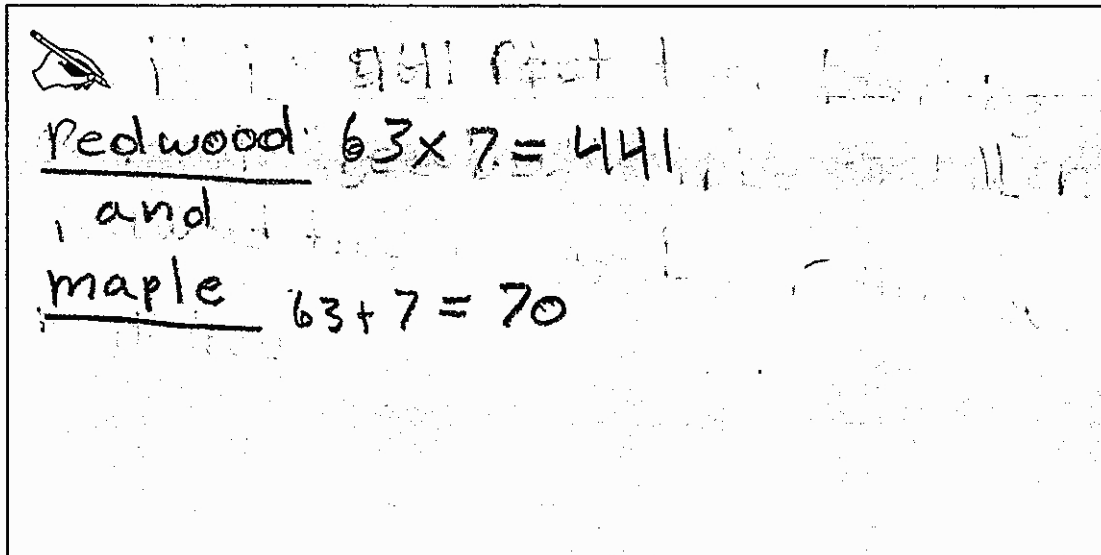
The student neither indicates that 63 is a multiple of 7 nor provides a diagram to illustrate or a description to explain that the maple tree would fit multiple times into the height of the redwood (no credit for 4.OA.A.1). No evidence is provided that the student has determined that the redwood is 9 times taller than the maple (no credit for 4.OA.A.2). The student uses the number line in Part C to indicate the relationship between the maple and the redwood by marking the 7th interval (MP4). The student does not represent in words or on the number line 9 multiples of 7 (no credit for MP6). In Part B, the student provides neither a sufficient diagram nor a division equation (no credit for MP7).

Total Awarded Points: 1 out of 5

1. Redwood Tree Task

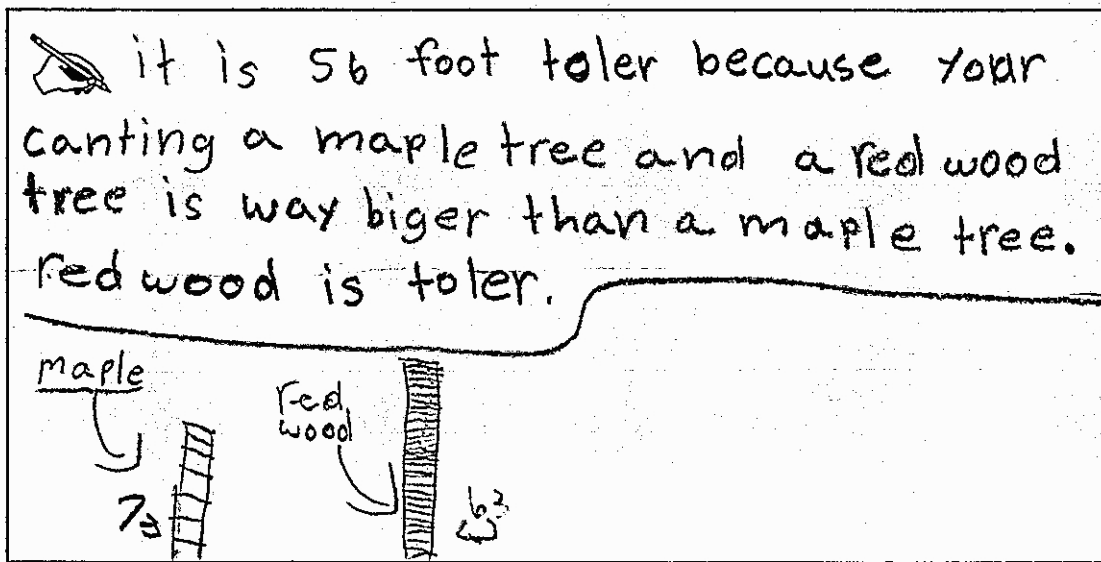
Howard read that a redwood tree measures 63 feet tall. Howard tried to picture the height of the redwood tree by comparing it to the 7-foot maple tree in his front yard.

- a. How many times taller is the redwood than the maple?



Redwood $63 \times 7 = 441$
and
maple $63 + 7 = 70$

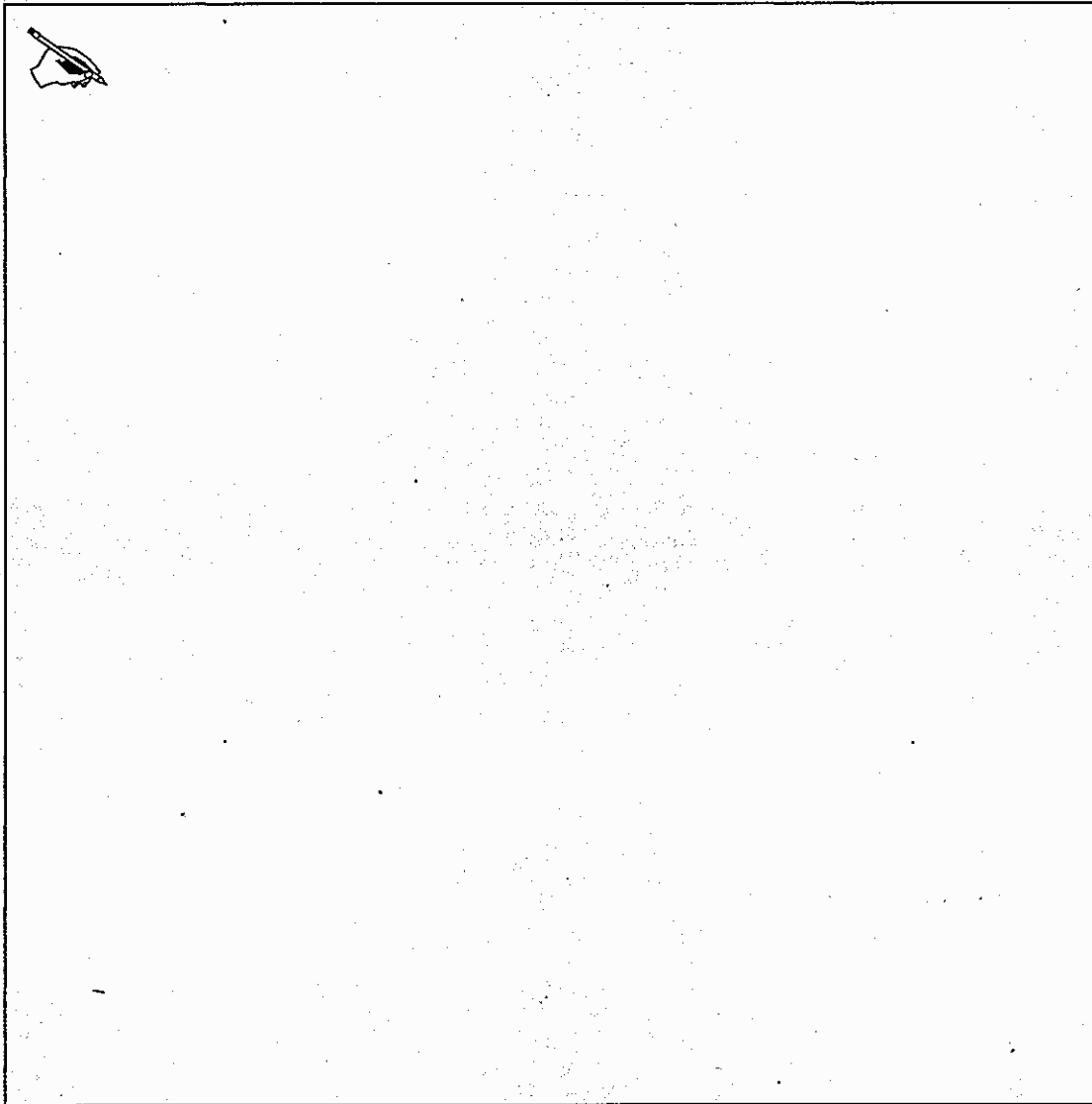
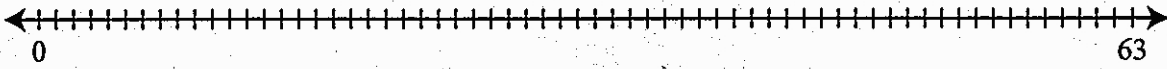
- b. Explain with words and drawings how Howard can use both multiplication and division equations to find how many times taller the redwood is than the maple.



it is 56 foot toler because your canting a maple tree and a red wood tree is way bigger than a maple tree. red wood is toler.

maple 7
red wood 63

- c. How could the number line be used to help Howard find how many times taller the redwood is than the maple? Use the number line and words to explain your thinking.



Total Content Points: 0

Total Practice Points: 0

The student neither indicates that 63 is a multiple of 7 nor provides an adequate diagram to illustrate or a description to explain that the maple tree would fit multiple times into the height of the redwood (no credit for 4.OA.A.1). No evidence is provided of the student determining the redwood is 9 times taller than the maple (no credit for 4.OA.A.2). The student neither provides an adequate diagram to clearly depict the multiplicative relationship between the height of the redwood and the maple nor marks the 7th interval on the number line in Part C to indicate the relationship between the redwood and the maple (no credit for MP4). The student does not represent in words or on the number line 9 multiples of 7 (no credit for MP6). In Part B, the student provides neither a sufficient diagram nor an adequate description to explicitly connect multiplication and division equations that model the problem(no credit for MP7).

Total Awarded Points: 0 out of 5