

TCAP/CRA 2012-2013



Task 4: Charlie's Number Lines Task Full Scoring Guide

Task 4. Charlie's Number Lines Task

Charlie claims that solving $\frac{1}{10} \div 2$ is different from solving $2 \div \frac{1}{10}$.


- a. Use the number line below to show the solution to $\frac{1}{10} \div 2$.



- b. Use the number line below to show the solution to $2 \div \frac{1}{10}$.




- c. Write a story problem that must be solved using the expression $\frac{1}{10} \div 2$.



A large rectangular box for writing a story problem. In the top-left corner, there is a small icon of a hand holding a pencil.

- d. Write a story problem that must be solved using the expression $2 \div \frac{1}{10}$.



A large rectangular box for writing a story problem. In the top-left corner, there is a small icon of a hand holding a pencil.



REVIEW YOUR
WORK IF YOU
HAVE TIME.

4. Charlie's Number Lines Task Scoring Guide

The CCSS for Mathematical Content (4 points)

5.NF.7a The student shows the solution to $\frac{1}{10} \div 2$ by situating the correct answer on the number line. _____

5.NF.7a The student provides a story problem that must be solved by the division problem $\frac{1}{10} \div 2$. The problem may show a situation in which $\frac{1}{10}$ is split into 2 equal groups. _____

5.NF.7b The student shows the solution to $2 \div \frac{1}{10}$ by situating the correct answer on the number line. _____

5.NF.7b The student provides a story problem that must be solved by the division problem $2 \div \frac{1}{10}$. The problem may require that 2 be split into groups of $\frac{1}{10}$. _____

Total Content Points _____

The CCSS for Mathematical Practice (3 points)

MP2 The student makes sense of the given expression by correctly showing the solution to $\frac{1}{10} \div 2$ on the number line and creating a context for the expression. _____
(MP2: Reason abstractly and quantitatively.)

MP2 The student makes sense of the given expression by correctly showing the solution to $2 \div \frac{1}{10}$ on the number line and creating a context for the expression. _____
(MP2: Reason abstractly and quantitatively.)

MP6 The student accurately represents $\frac{1}{10} \div 2$ and $2 \div \frac{1}{10}$ on the number lines and shows the complete work to solve the expressions. _____
(MP6: Attend to precision.)

Total Practice Points _____

Total Awarded Points _____

The CCSS for Mathematical Content Addressed in This Task

Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.

5.NF.7a Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *For example, create a story context for $(1/3) \div 4$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$.*

5.NF.7b Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for $4 \div (1/5)$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$.*

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.

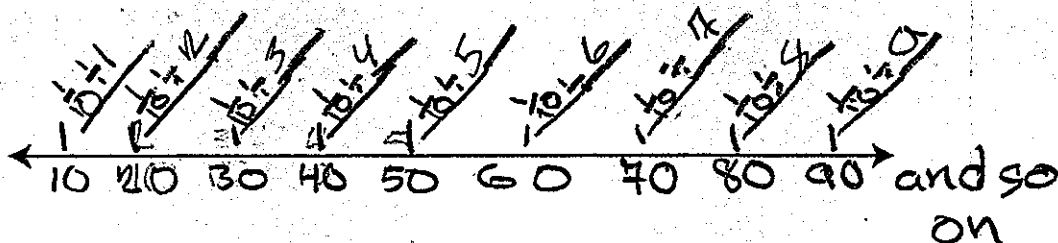
*Gray text indicates Mathematical Practices that are not addressed in this task.

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.

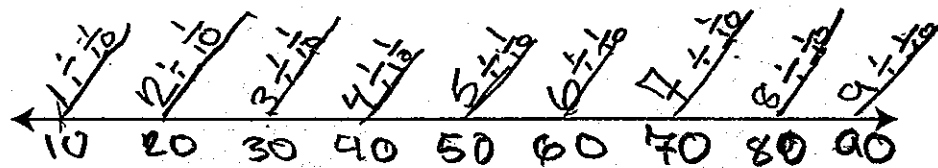
Task 4. Charlie's Number Lines Task

Charlie claims that solving $\frac{1}{10} \div 2$ is different from solving $2 \div \frac{1}{10}$.


- a. Use the number line below to show the solution to $\frac{1}{10} \div 2$.




- b. Use the number line below to show the solution to $2 \div \frac{1}{10}$.



- c. Write a story problem that must be solved using the expression $\frac{1}{10} \div 2$.

 There is $\frac{1}{10}$ of a piece of chocolate left. Sarah & Hannah wanted to split it. How much chocolate would the both of them get?

- d. Write a story problem that must be solved using the expression $2 \div \frac{1}{10}$.

 There are 2 cups of flour. Each batch of 12 cupcakes needs $\frac{1}{10}$. How many batches can you make?



REVIEW YOUR
WORK IF YOU
HAVE TIME.

Guide 1

Litho 10645

Total Content Points: 4 (5.NF.7a(a), 5.NF.7a(b), 5.NF.7b(a), 5.NF.7b(b))

Total Practice Points: 1 (MP2(b))

The student shows the solution to $\frac{1}{10} \div 2$ by indicating $\frac{1}{20}$ on the number line

(5.NF.7a(a)). The student shows the solution to $2 \div \frac{1}{10}$ by indicating 20 on the number

line (5.NF.7b(a)). Although the student correctly shows the solution to $\frac{1}{10} \div 2$ in Part A,

the number line is inaccurate, with fractions of decreasing value going to the right instead of the left (no credit for MP2(a)), demonstrating a lack of precision (no credit for

MP6). The student correctly shows the solution to $2 \div \frac{1}{10}$ in Part B indicating 20 on the

number line (MP2(b)). The story problem in Part C can be solved by the division problem

$\frac{1}{10} \div 2$ (5.NF.7a(b)) and the story problem in Part D can be solved by the division

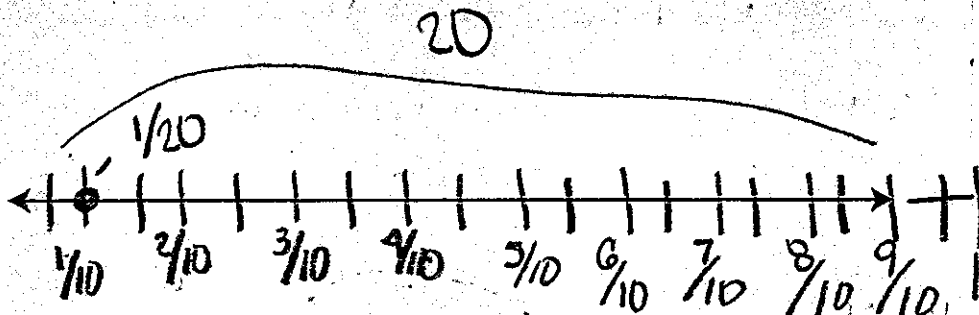
problem $2 \div \frac{1}{10}$ (5.NF.7b(b)).

Total Awarded Points: 5 out of 7

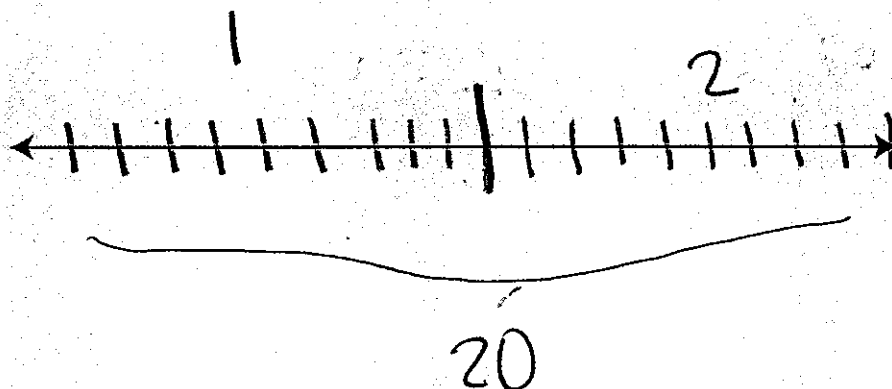
Task 4. Charlie's Number Lines Task

Charlie claims that solving $\frac{1}{10} \div 2$ is different from solving $2 \div \frac{1}{10}$.


a. Use the number line below to show the solution to $\frac{1}{10} \div 2$.




b. Use the number line below to show the solution to $2 \div \frac{1}{10}$.



- c. Write a story problem that must be solved using the expression $\frac{1}{10} \div 2$.

 SYDNEY HAS $\frac{1}{10}$ OF ALL OF THE PIE SHE BROUGHT HOME NOW. HER BROTHER WANTED TWO EQUAL SLICES OF PIE AS HER. SHE CUT THE PIE INTO 2 PIECES HOW MANY EQUAL SMALL PIECES CAN SHE MAKE OUT OF BOTH SLICES. $\frac{1}{10} \div 2 = \frac{1}{20}$

- d. Write a story problem that must be solved using the expression $2 \div \frac{1}{10}$.

 MARK HAS 2 PIECES OF CAKE HE CUTS THE SLICES INTO $\frac{1}{10}$ HOW MANY PIECES DOES HE HAVE NOW.
 $2 \div \frac{1}{10} = 20$.



REVIEW YOUR
WORK IF YOU
HAVE TIME.

Guide 2

Litho 10660

Total Content Points: 3 (5.NF.7a(a), 5.NF.7b(a), 5.NF.7b(b))

Total Practice Points: 1 (MP2(b))

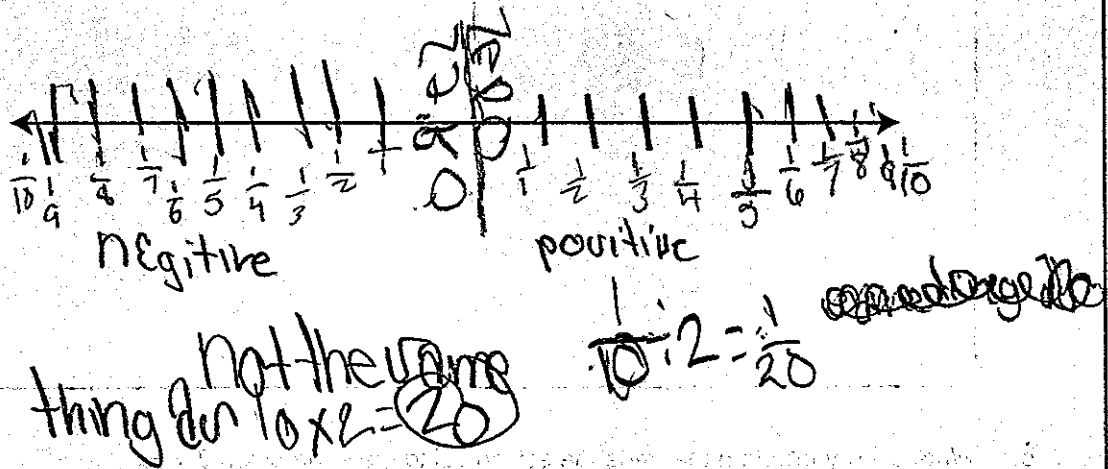
The student indicates with the dot on the number line that the solution to $\frac{1}{10} \div 2$ is $\frac{1}{20}$ (5.NF.7a(a)). The student indicates that the solution to $2 \div \frac{1}{20}$ is 20 (5.NF.7b(a)). On number line in Part A, the correct solution, $\frac{1}{20}$, is incorrectly placed to the right of $\frac{1}{10}$ (no credit for MP2(a)), indicating a lack of precision (no credit for MP6). The student correctly illustrates the solution to $2 \div \frac{1}{10}$ in Part B, dividing 2 into 20 tenths on the number line (MP2(b)). The story problem in Part C (“How many equal small pieces can she make out of both slices”) cannot be solved by the division problem $\frac{1}{10} \div 2$ (no credit for 5.NF.7a(b)). The story problem in Part D can be solved by the division problem $2 \div \frac{1}{10}$ (5.NF.7b(b)).

Total Awarded Points: 4 out of 7

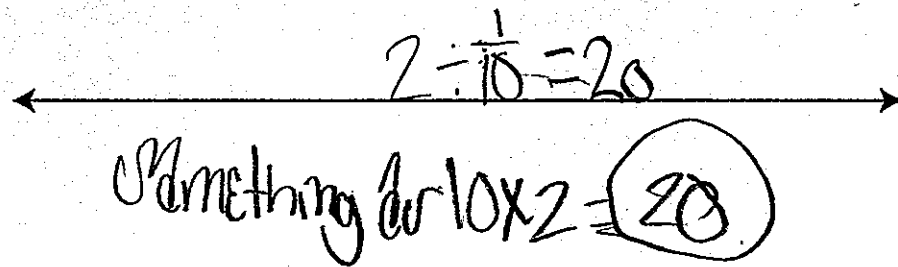
Task 4. Charlie's Number Lines Task

Charlie claims that solving $\frac{1}{10} \div 2$ is different from solving $2 \div \frac{1}{10}$.


- a. Use the number line below to show the solution to $\frac{1}{10} \div 2$.




- b. Use the number line below to show the solution to $2 \div \frac{1}{10}$.



c. Write a story problem that must be solved using the expression $\frac{1}{10} \div 2$.

 ~~Chyna~~ Chyna Spencer had $\frac{1}{10}$ of 2 cakes how much cake did she eat

d. Write a story problem that must be solved using the expression $2 \div \frac{1}{10}$.

 Chyna had 2 cakes. They were cut into $\frac{1}{10}$. How many slices of cake will there be if you divided.



REVIEW YOUR WORK IF YOU HAVE TIME.

Guide 3

Litho 10661

Total Content Points: 3 (5.NF.7a(a), 5.NF.7b(a), 5.NF.7b(b))

Total Practice Points: 0

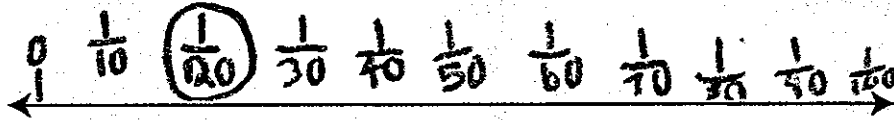
The student correctly shows the solution to $\frac{1}{10} \div 2$ (5.NF.7a(a)). The student shows the correct solution to $2 \div \frac{1}{20}$ (5.NF.7b(a)). The solution to $\frac{1}{10} \div 2$ in Part A is not correctly shown on the number line (no credit for MP2(a)), and the solution to $2 \div \frac{1}{10}$ in Part B is not correctly shown on the number line (no credit for MP2(b)), indicating a lack of precision (no credit for MP6). The story problem in Part C cannot be solved by the division problem $\frac{1}{10} \div 2$ (no credit for 5.NF.7a(b)). The story problem in Part D can be solved by the division problem $2 \div \frac{1}{10}$ (5.NF.7b(b)).

Total Awarded Points: 3 out of 7

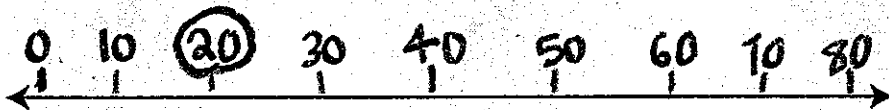
Task 4. Charlie's Number Lines Task

Charlie claims that solving $\frac{1}{10} \div 2$ is different from solving $2 \div \frac{1}{10}$.


- a. Use the number line below to show the solution to $\frac{1}{10} \div 2$.




- b. Use the number line below to show the solution to $2 \div \frac{1}{10}$.



- c. Write a story problem that must be solved using the expression $\frac{1}{10} \div 2$.

 Joe is eating a 1 pizza cut into 100 peices he eats 80 peices what part of the pizza did he eat?

- d. Write a story problem that must be solved using the expression $2 \div \frac{1}{10}$.

 There are two pies and each pie must be cut in $\frac{1}{10}$ per slice how many slices are in a pie?



REVIEW YOUR
WORK IF YOU
HAVE TIME.

Guide 4

Litho 10586

Total Content Points: 2 (5.NF.7a(a), 5.NF.7b(a))

Total Practice Points: 0

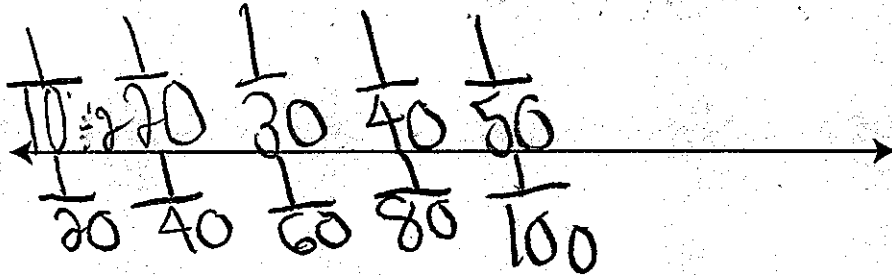
The student correctly shows the solution to $\frac{1}{10} \div 2$ by circling $\frac{1}{20}$ on the number line (5.NF.7a(a)). The student correctly shows the solution to $2 \div \frac{1}{10}$ by circling 20 on the number line (5.NF.7b(a)). In Part A, the correct solution, $\frac{1}{20}$, is incorrectly placed to the right instead of to the left of $\frac{1}{10}$ on the number line (no credit for MP2(a)). This inaccurate number line, with fractions of decreasing value labeled from left to right instead of from right to left, demonstrates a lack of precision (no credit for MP6). In Part B, the correct solution, 20, is placed on the number line, but there is no context to show how the student arrived at that answer (no credit for MP2(a)). The story problem in Part C cannot be solved by the division problem $\frac{1}{10} \div 2$ (no credit for 5.NF.7a(b)), and the story problem in Part D (“how many slices are in a pie?”) cannot be solved by the division problem $2 \div \frac{1}{10}$ (no credit for 5.NF.7b(b)).

Total Awarded Points: 2 out of 7

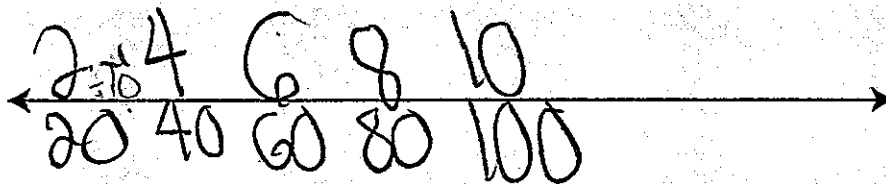
Task 4. Charlie's Number Lines Task

Charlie claims that solving $\frac{1}{10} \div 2$ is different from solving $2 \div \frac{1}{10}$.


- a. Use the number line below to show the solution to $\frac{1}{10} \div 2$.




- b. Use the number line below to show the solution to $2 \div \frac{1}{10}$.



- c. Write a story problem that must be solved using the expression $\frac{1}{10} \div 2$.

 Charlie has $\frac{1}{10}$ of 2 pies how much does she have in each category?

- d. Write a story problem that must be solved using the expression $2 \div \frac{1}{10}$.

 Charlie has 2 of $\frac{1}{10}$ of a loaf of bread how much will it be if she divided?



REVIEW YOUR
WORK IF YOU
HAVE TIME.

Guide 5

Litho 10588

Total Content Points: 2 (5.NF.7a(a), 5.NF.7b(a))

Total Practice Points: 0

The student correctly shows the solution to $\frac{1}{10} \div 2$ below the number line (5.NF.7a(a)).

The student correctly shows the solution to $2 \div \frac{1}{10}$ below the number line (5.NF.7b(a)).

In Part A, the correct solution is placed to the right instead of to the left of $\frac{1}{10}$ (no credit for MP2(a)). This incorrect number line, with fractions of decreasing value going from left to right instead of from right to left, indicates a lack of precision (no credit for MP6). In

Part B, the student does not accurately show $2 \div \frac{1}{10}$ on the number line (no credit for

MP2(b)). The story problem in Part C cannot be solved using the division problem $\frac{1}{10} \div 2$ (no credit for 5.NF.7a(b)), and the story problem in Part D cannot be solved

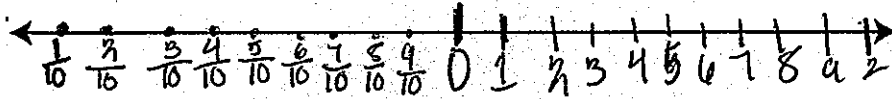
using the division problem $2 \div \frac{1}{10}$ (no credit for 5.NF.7b(b)).

Total Awarded Points: 2 out of 7

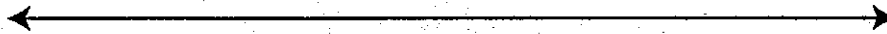
Task 4. Charlie's Number Lines Task

Charlie claims that solving $\frac{1}{10} \div 2$ is different from solving $2 \div \frac{1}{10}$.


- a. Use the number line below to show the solution to $\frac{1}{10} \div 2$.




- b. Use the number line below to show the solution to $2 \div \frac{1}{10}$.



- c. Write a story problem that must be solved using the expression $\frac{1}{10} + 2$.

 Sarah has $\frac{1}{10}$ a cup of sugar and is making 2 cookies. How much sugar will be in each cookie?

- d. Write a story problem that must be solved using the expression $2 + \frac{1}{10}$.

 ~~Katilyn is making cupcakes. Each~~
 Katilyn and Jesus have two cups of ^{flour} ~~flour~~.
 Each recipe requires $\frac{1}{10}$ cups of ~~flour~~ flour.
 How many of this recipe can they make?



REVIEW YOUR
WORK IF YOU
HAVE TIME.

Guide 6

Litho 10647

Total Content Points: 2 (5.NF.7a(b), 5.NF.7b(b))

Total Practice Points: 0

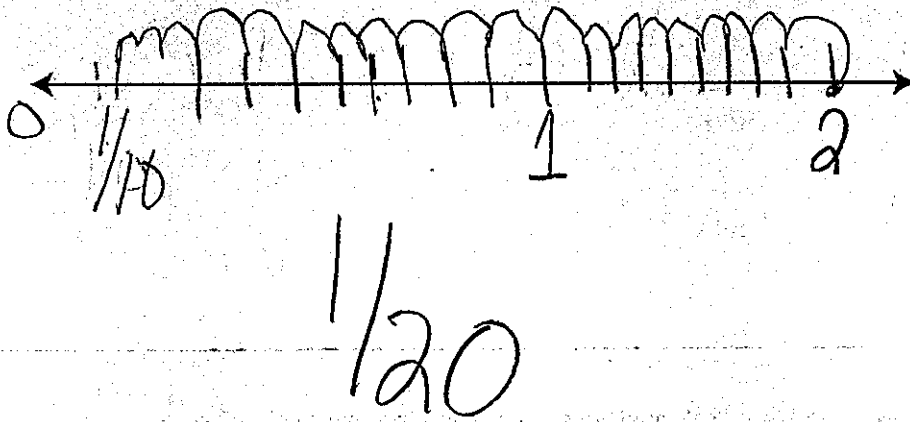
The student does not show the solution to $\frac{1}{10} \div 2$ (no credit for 5.NF.7a(a)). The student does not attempt to determine the solution to $2 \div \frac{1}{10}$ (no credit for 5.NF.7b(a)). The student does not correctly show the solution on the number line in Part A (no credit for MP2(a)), demonstrating a lack of precision (no credit for MP6). The student does not attempt a solution in Part B (no credit for MP2(b)). The story problem in Part C can be solved using the division problem $\frac{1}{10} \div 2$ (5.NF.7a(b)), and the story problem in Part D can be solved using the division problem $2 \div \frac{1}{10}$ (5.NF.7b(b)).

Total Awarded Points: 2 out of 7

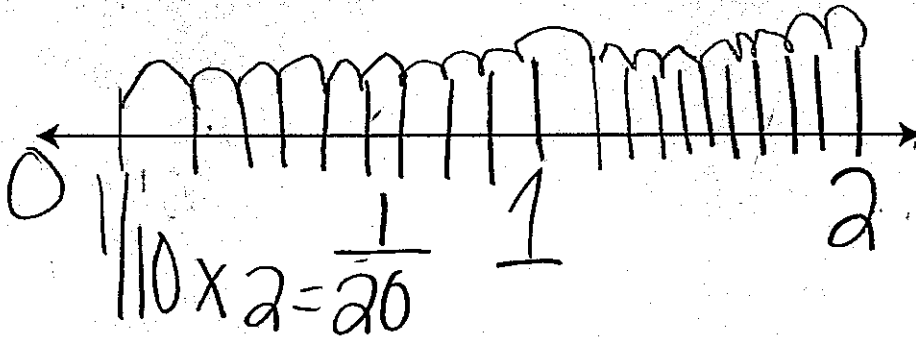
Task 4. Charlie's Number Lines Task

Charlie claims that solving $\frac{1}{10} \div 2$ is different from solving $2 \div \frac{1}{10}$.


- a. Use the number line below to show the solution to $\frac{1}{10} \div 2$.




- b. Use the number line below to show the solution to $2 \div \frac{1}{10}$.



- c. Write a story problem that must be solved using the expression $\frac{1}{10} \div 2$.

 Taylor had $\frac{1}{10}$ of string left, she divide that by 2 how much string does she have left.

- d. Write a story problem that must be solved using the expression $2 \div \frac{1}{10}$.

 Taylor has 2 ft. of string she; then divides it by $\frac{1}{10}$, how much string does she have left.



REVIEW YOUR
WORK IF YOU
HAVE TIME.

Guide 7

Litho 10638

Total Content Points: 1 (5.NF.7a(a))

Total Practice Points: 0

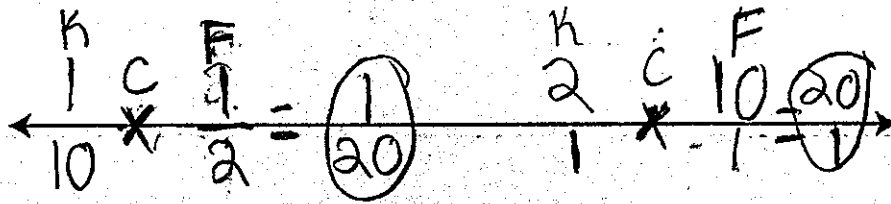
The student shows the correct solution to $\frac{1}{10} \div 2$ (5.NF.7a(a)). The solution of $\frac{1}{20}$ for $2 \div \frac{1}{10}$ is incorrect (no credit for 5.NF.7b(a)). The number line in Part A does not show that $\frac{1}{10} \div 2 = \frac{1}{20}$ (no credit for MP2(a)), indicating a lack of precision (no credit for MP6). The student divides the number line in Part B into tenths, but the equation $\frac{1}{10} \times 2 = \frac{1}{20}$ indicates that the student does not understand how to reasonably use the information (no credit for MP2(b)). The story problem in Part C (“how much string does she have left”) cannot be solved by the division problem $\frac{1}{10} \div 2$ (no credit for 5.NF.7a(b)). The story problem in Part D (“how much string does she have left”) cannot be solved by the division problem $2 \div \frac{1}{10}$ (no credit for 5.NF.7b(b)).

Total Awarded Points: 1 out of 7

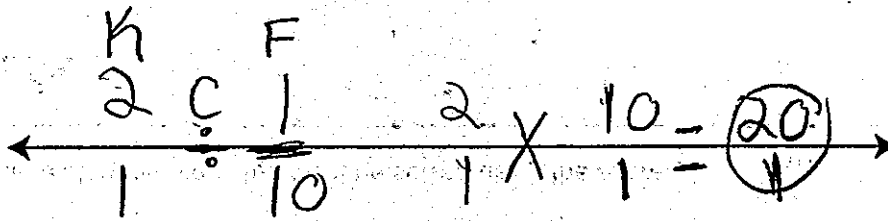
Task 4. Charlie's Number Lines Task

Charlie claims that solving $\frac{1}{10} \div \frac{2}{1}$ is different from solving $\frac{2}{1} \div \frac{1}{10}$.


- a. Use the number line below to show the solution to $\frac{1}{10} \div \frac{2}{1}$.




- b. Use the number line below to show the solution to $2 \div \frac{1}{10}$.



- c. Write a story problem that must be solved using the expression $\frac{1}{10} + 2$.

 Ms. Cation has $\frac{1}{10}$ of a bag of candy if she bought 2 bags of candy how many are there in the bag?

- d. Write a story problem that must be solved using the expression $2 + \frac{1}{10}$.

 Luke have 2 sandwich he ate $\frac{1}{10}$ of a sandwich how much does Luke have left.



REVIEW YOUR
WORK IF YOU
HAVE TIME.

Total Content Points: 1 (5.NF.7b)

Total Practice Points: 0

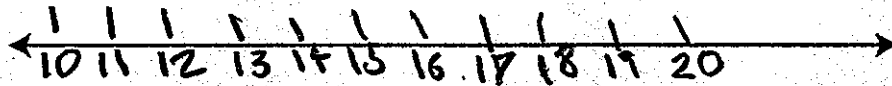
The student circles two solutions for $\frac{1}{10} \div 2$, $\frac{1}{20}$ and $\frac{20}{1}$, on number line in Part A (no credit for 5.NF.7a(a)). The correct solution ($\frac{20}{1}$) to $2 \div \frac{1}{10}$ is circled on the number line in Part B (5.NF.7b(a)). The student does not show how to solve $\frac{1}{10} \div 2$ in Part A (no credit for MP2(a)) and does not show how to solve $2 \div \frac{1}{10}$ in Part B (no credit for MP2(b)). The student does not use the number lines to solve the problems and writes two answers for $\frac{1}{10} \div 2$, demonstrating a lack of precision (no credit for MP6). The story problem in Part C cannot be solved by the division problem $\frac{1}{10} \div 2$ (no credit for 5.NF.7a(b)), and the story problem in Part D cannot be solved by the division problem $2 \div \frac{1}{10}$ (no credit for 5.NF.7b(b)).

Total Awarded Points: 1 out of 7

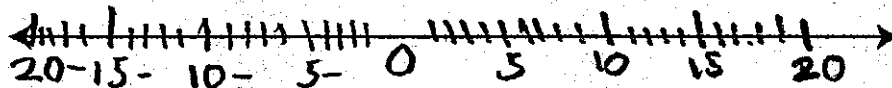
Task 4. Charlie's Number Lines Task

Charlie claims that solving $\frac{1}{10} \div 2$ is different from solving $2 \div \frac{1}{10}$.


- a. Use the number line below to show the solution to $\frac{1}{10} \div 2$.



- b. Use the number line below to show the solution to $2 \div \frac{1}{10}$.




- c. Write a story problem that must be solved using the expression $\frac{1}{10} \div 2$.



A large rectangular box for writing a story problem. In the top-left corner, there is a small icon of a hand holding a pen, indicating where to start writing.

- d. Write a story problem that must be solved using the expression $2 \div \frac{1}{10}$.



A large rectangular box for writing a story problem. In the top-left corner, there is a small icon of a hand holding a pen, indicating where to start writing.



REVIEW YOUR
WORK IF YOU
HAVE TIME.

Total Content Points: 0

Total Practice Points: 0

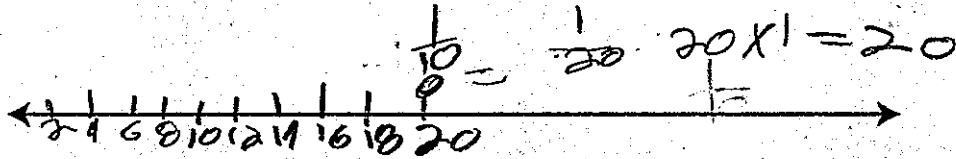
Although the student ends the number line in Part A with $\frac{1}{20}$, this value is not marked as the solution to $\frac{1}{10} \div 2$ (no credit for 5.NF.7a(a)). Although the student ends the number line in Part B with 20, this value is not marked as the solution to $2 \div \frac{1}{10}$ (no credit for 5.NF.7b(b)). In Part A, the number line incorrectly shows fractions of decreasing value from left to right instead of from right to left (no credit for MP2(a)). The student does not give a clear solution on either number line (no credit for MP2(b)), indicating a lack of precision (no credit for MP6). The student does not attempt Part C (no credit for 5.NF.7a(b)) or Part D (no credit for 5.NF.7b(b)).

Total Awarded Points: 0 out of 7

Task 4. Charlie's Number Lines Task

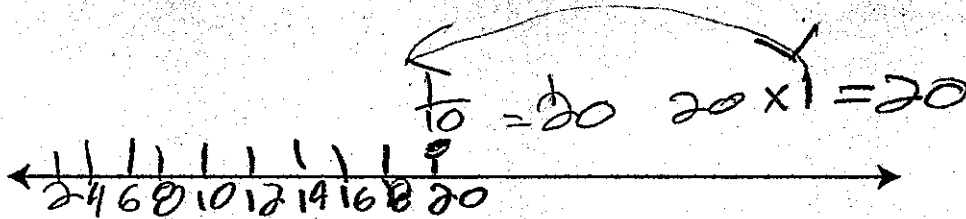
Charlie claims that solving $\frac{1}{10} \div 2$ is different from solving $2 \div \frac{1}{10}$.

- a. Use the number line below to show the solution to $\frac{1}{10} \div 2$.




same

- b. Use the number line below to show the solution to $2 \div \frac{1}{10}$.




c. Write a story problem that must be solved using the expression $\frac{1}{10} \div 2$.

 $\frac{1}{10} \div 2 = 20$

$10 \times 2 = 20$ $20 \times 1 = 20$
 as also $\frac{1}{20}$

~~same~~

d. Write a story problem that must be solved using the expression $2 \div \frac{1}{10}$.

 $2 \div \frac{1}{10}$ $2 \times \frac{10}{1} = 20$

$2 \div \frac{1}{10} = 20$
 $10 \times 2 = 20$



REVIEW YOUR WORK IF YOU HAVE TIME.

Total Content Points: 0

Total Practice Points: 0

The student shows an incorrect solution of 20 for $\frac{1}{10} \div 2$ (no credit for 5.NF.7a(a)). The number line in Part A does not correctly show the solution to $\frac{1}{10} \div 2$ (no credit for MP2(a)), and the number line in Part B does not correctly show how to get the solution to $2 \div \frac{1}{10}$ (no credit for MP2(b)). Although the student gives the correct solution for $2 \div \frac{1}{10}$, the solutions to parts A and B are indicated to be the “same,” as well as the different values, $\frac{1}{20}$ and 20, given as solutions to parts C and D. This confusion indicates overall lack of understanding division with fractions (no credit for 5.NF.7b(a)). The student does not write a story problem for Part C (no credit for 5.NF.7a(b)) or Part D (no credit for 5.NF.7b(b)). The student’s equations, number lines, solutions, and explanations are inaccurate, indicating a lack of precision (no credit for MP6).

Total Awarded Points: 0 out of 7