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**New York State Testing Program
Grade 4 Common Core
Mathematics Test**

Released Questions with Annotations

August 2013



THE STATE EDUCATION DEPARTMENT / THE UNIVERSITY OF THE STATE OF NEW YORK /
ALBANY, NY 12234

New York State Testing Program Grade 4 Common Core Mathematics Test

Released Questions with Annotations

With the adoption of the New York P-12 Common Core Learning Standards (CCLS) in ELA/Literacy and Mathematics, the Board of Regents signaled a shift in both instruction and assessment. In Spring 2013, New York State administered the first set of tests designed to assess student performance in accordance with the instructional shifts and the rigor demanded by the Common Core State Standards (CCSS). To aid in the transition to new tests, New York State released a number of resources during the 2012-2013 year, including test blueprints and specifications, and criteria for writing test questions. These resources can be found at <http://www.engageny.org/common-core-assessments>.

New York State administered the first ELA/Literacy and Mathematics Common Core tests in April 2013 and is now making a portion of the questions from those tests available for review and use. These released questions will help students, families, educators, and the public better understand how tests have changed to assess the instructional shifts demanded by the Common Core and to assess the rigor required to ensure that all students are on track to college and career readiness.

Annotated Questions Are Teaching Tools

The released questions are intended to help students, families, educators, and the public understand how the Common Core is different. The annotated questions will demonstrate the way the Common Core should drive instruction and how tests have changed to better assess student performance in accordance with the instructional shifts demanded by the Common Core. They are also intended to help educators identify how the rigor of the State tests can inform classroom instruction and local assessment. The annotations will indicate common student misunderstandings related to content standards; educators should use these to help inform unit and lesson planning. In some cases, the annotations may offer insight into particular instructional elements (conceptual thinking, visual models) that align to the Common Core that may be used in curricular design. It should not be assumed, however, that a particular standard will be measured with an identical item in future assessments.

The annotated questions will include both multiple-choice and constructed-response questions. With each multiple-choice question released, a rationale will be available to demonstrate why the question measures the intended standards; why the correct answer is correct; and why each wrong answer is plausible but incorrect. The rationales describe why the wrong answer choices are plausible but incorrect and are based in common errors in computation. While these rationales will speak to a possible and likely reason for selection of the incorrect option by the student, these rationales do not contain definitive statements as to why the student chose the incorrect option or what we can infer about knowledge and skills of the student based on their selection of an incorrect response. These multiple-choice questions are designed to assess student proficiency, not to diagnose specific misconceptions/errors with each and every incorrect option.

Additionally, for each constructed-response question, there will be an explanation for why the question measures the intended standards and sample student responses representing each possible score point.

Questions from the upper grades may feature more detailed annotations, as the items tend to be more complex.

Understanding Math Annotated Questions

Multiple Choice

Multiple-choice questions are designed to assess CCLS for Mathematics. Mathematics multiple-choice questions will mainly be used to assess standard algorithms and conceptual standards. Multiple-choice questions incorporate both Standards and Standards for Mathematical Practices, some in real-world applications. Many multiple-choice questions require students to complete multiple steps. Likewise, many of these questions are linked to more than one standard, drawing on the simultaneous application of multiple skills and concepts. Within answer choices, distractors will all be based on plausible missteps.

Short and extended constructed-response questions may refer to the scoring rubric, which can be found at www.engageny.org/resource/test-guides-for-english-language-arts-and-mathematics.

Short Response

Short-response questions are similar to past 2-point questions, requiring students to complete a task and show their work. Like multiple-choice questions, short-response questions will often require multiple steps, the application of multiple mathematics skills, and real-world applications. Many of the short-response questions will cover conceptual and application Standards.

Extended Response

Extended-response questions are similar to past 3-point questions, asking students to show their work in completing two or more tasks or a more extensive problem. Extended-response questions allow students to show their understanding of mathematical procedures, conceptual understanding, and application. Extended-response questions may also assess student reasoning and the ability to critique the arguments of others.

Released Questions Do Not Comprise a Mini Test

This document is NOT intended to show how operational tests look or to provide information about how teachers should administer the test; rather, the purpose of the released questions is to provide an overview of how the new test reflects the demands of the Common Core.

The released questions do not represent the full spectrum of standards assessed on the State test, nor do they represent the full spectrum of how the Common Core should be taught and assessed in the classroom. Specific criteria for writing test questions as well as additional instruction and test information is available on www.engageny.org/common-core-assessments.

Which number is sixteen thousand four hundred seventy-two in standard form?

- A** 16,472
- B** 16,702
- C** 160,472
- D** 164,702

Key: A

Measured CCLS: 4.NBT.2

Commentary: The item measures 4.NBT.2 because it asks the student to convert a multi-digit whole number from a number name to standard form.

Answer Choice A: 16,472 - This response indicates the student has a clear understanding of converting a multi-digit whole number from a number name to standard form, using principles of place value and the meanings of the digits in each place.

Answer Choice B: 16,702 - This response indicates the student may not have a clear understanding of place value and the meanings of the digits in each place when expressed as a number name. The student likely confused seventy with the hundreds place when converting to standard form; and did not account for the four hundred.

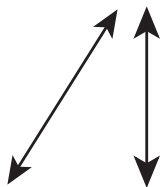
Answer Choice C: 160,472 - This response indicates the student may not have a clear understanding of place value and the meanings of the digits in each place when expressed as number name. The student likely confused sixteen thousand with one hundred sixty thousand when converting to standard form.

Answer Choice D: 164,702 - This response indicates the student may not have a clear understanding of place value and the meanings of the digits in each place when expressed as a number name. The student likely confused sixteen thousand with one hundred sixty thousand; placed the four in the thousands place, instead of the hundreds place; and confused seventy with the hundreds place when converting to standard form.

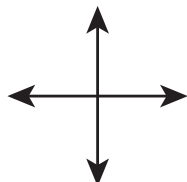
Answer options B, C, and D are plausible but incorrect. They represent common student errors when converting a multi-digit whole numbers from one form to another.

Which figure appears to show two parallel lines?

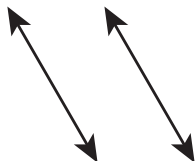
A



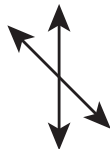
B



C



D



Key: C

Measured CCLS: 4.G.1

Commentary: The item measures 4.G.1 because it asks the student to identify parallel lines.

Answer Choice A: This response indicates a limited understanding of geometric classifications. The student may believe that since the intersection of the two lines is not shown that the two lines are parallel.

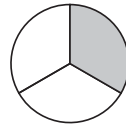
Answer Choice B: This response indicates a limited understanding of geometric classifications. The student may believe that two lines are parallel if they form right angles when they intersect. Or, the student may have confused the definition for parallel lines with that of perpendicular lines.

Answer Choice C: This response indicates a clear understanding of parallel, knowing that parallel lines are two lines on a shared plane that are always the same distance apart and will never intersect.

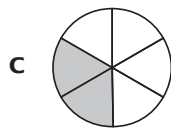
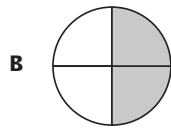
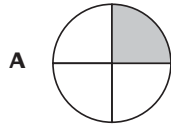
Answer Choice D: This response indicates a limited understanding of geometric classifications. The student may believe that two lines are parallel if they intersect and do not form right angles.

Answer options A, B, and D are plausible but incorrect. They indicate a limited understanding of geometric classifications, specifically classifying lines as parallel.

Tom shaded the figure below to model a fraction.



Which figure models an equivalent fraction?



Key: C

Measured CCLS: 4.NF.1

Commentary: The item measures 4.NF.1 because it asks the student to recognize equivalent fractions using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions are equivalent.

Answer Choice A: This response indicates a student may not have a clear understanding of using a visual fraction model to represent equivalent fractions. The student may have selected a model with one part shaded because the model given had only one part shaded, without paying attention the differing size of the parts.

Answer Choice B: This response indicates a student may not have a clear understanding of using a visual fraction model to represent equivalent fractions. The student may have selected the model that had the same number of unshaded parts as in the given model.

Answer Choice C: This response indicates a clear understanding of using a visual fraction model to represent equivalent fractions. Even though it has a different number and size of parts compared to the given model, the student recognizes that the shaded region represents $\frac{2}{6}$ and is equivalent to $\frac{1}{3}$ of the whole.

Answer Choice D: This response indicates a student may not have a clear understanding of using a visual fraction model to represent equivalent fractions. The student may have selected a model with three parts shaded because the model given had three parts or may have made a visual estimate without verifying if the two models were equivalent.

Answer options A, B, and D are plausible but incorrect. They represent common student errors made when using a visual fraction model to represent equivalent fractions.

There are 5,280 feet in a mile. What is the total number of feet in 6 miles?

- A** 31,280
- B** 31,680
- C** 33,680
- D** 35,280

Key: B

Measured CCLS: 4.NBT.5

Commentary: The item measures 4.NBT.5 because it asks the student to multiply a four-digit whole number by a one-digit whole number. Compare with the item on page 6, which also assesses 4.NBT.5.

Answer Choice A: 31,280 - This response indicates the student may not be able to perform the operation with precision. The student may not have regrouped the tens into the four hundreds.

Answer Choice B: 31,680 - This response indicates the student is able to perform the operation with precision, finding the correct response.

Answer Choice C: 33,680 - This response indicates the student may not be able to perform the operation with precision. The student may have added the regrouped digit to the 2 in the hundreds place before multiplying: $30,000 + 6 \times (200 + 400) + 80$.

Answer Choice D: 35,280 - This response indicates the student may not be able to perform the operation with precision. The student may have added all regrouped digits to the product of the thousands place: $[(4 + 1 + 30) \times 1,000] + 200 + 80$.

Answer options A, C, and D are plausible but incorrect. They represent common student errors when multiplying a four-digit whole number by a one-digit whole number.

Which number sentence is true?

A $\frac{3}{8} < \frac{1}{4}$

B $\frac{1}{2} < \frac{3}{6}$

C $\frac{3}{5} = \frac{8}{10}$

D $\frac{2}{3} = \frac{4}{6}$

Key: D

Measured CCLS: 4.NF.2

Commentary: The item measures 4.NF.2 because it asks the student to compare two fractions with different numerators and different denominators. Students may compare by creating common denominators or by comparing to a benchmark fraction; they will record their comparisons using the < and = symbols.

Answer Choice A: $\frac{3}{8} < \frac{1}{4}$ - This response indicates the student may not have a clear understanding of fraction equivalence and ordering, and may believe a fraction with a greater denominator will always have less value when compared to a fraction with a smaller denominator.

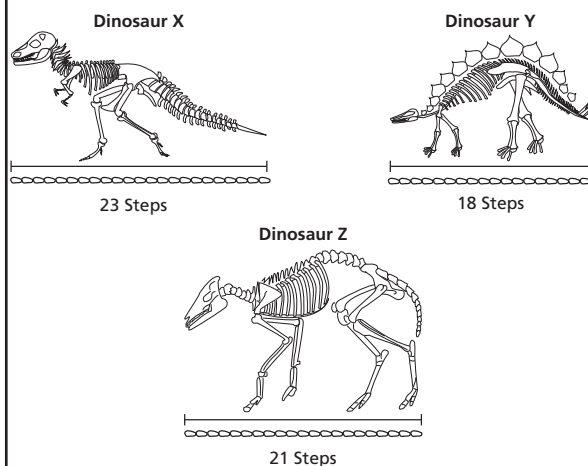
Answer Option B: $\frac{1}{2} < \frac{3}{6}$ - This response indicates the student may not have a clear understanding of fraction equivalence and ordering. Students may incorrectly believe fractions with a greater denominator or a greater numerator have a greater value than a fraction with a lesser denominator or a lesser numerator.

Answer Option C: $\frac{3}{5} = \frac{8}{10}$ - This response indicates the student may not have a clear understanding of fraction equivalence. Students may think that adding the same number to the numerator and denominator, in this case 5, will create an equivalent fraction.

Answer Option D: $\frac{2}{3} = \frac{4}{6}$ - This response indicates the student has a clear understanding of fraction equivalence. The student understands that multiplying or dividing a numerator and denominator by the same factor will create an equivalent fraction; in this case the factor is 2.

Answer options A, B, and C are plausible but incorrect. They indicate a limited understanding of fraction equivalence and ordering.

Bradley saw 3 dinosaur skeletons at the museum. To measure the length of each skeleton, he counted the number of his shoe lengths from the head to the tail, as shown in the picture below.



KEY

○ = 1 shoe length

Bradley's shoe length is 17 cm long. Which list shows the dinosaur skeletons that were more than 320 centimeters long?

- A Dinosaur X and Dinosaur Y
- B Dinosaur X and Dinosaur Z
- C Dinosaur Y and Dinosaur Z
- D Dinosaur X, Dinosaur Y, and Dinosaur Z

Key: B

Measured CCLS: 4.NBT.5

Commentary: The item measures 4.NBT.5 because it asks the student to multiply two two-digit whole numbers. Compare with the item on page 4, which also assesses 4.NBT.5.

Answer Choice A: Dinosaur X and Dinosaur Y - This response indicates the student may not have a clear understanding of multiplying two two-digit numbers, or has a clear understanding but lacks precision in his or her calculations. The length of the skeletons of Dinosaur X was 391 centimeters; Dinosaur Y was 306 centimeters and Dinosaur Z was 357 centimeters.

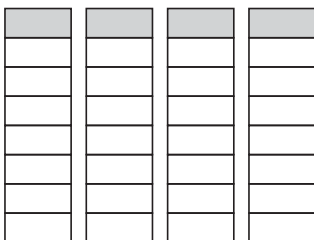
Answer Choice B: Dinosaur X and Dinosaur Z - This response shows a clear understanding of multiplying two two-digit numbers. The student found the length of the skeletons of Dinosaur X was 391 centimeters; Dinosaur Y was 306 centimeters and Dinosaur Z was 357 centimeters. So, the dinosaur skeletons that were more than 320 centimeters long were Dinosaur X and Dinosaur Z.

Answer Choice C: Dinosaur Y and Dinosaur Z - This response indicates the student may not have a clear understanding of multiplying two two-digit numbers, or has a clear understanding but lacks precision in his or her calculations. The length of the skeletons of Dinosaur X was 391 centimeters; Dinosaur Y was 306 centimeters and Dinosaur Z was 357 centimeters.

Answer Choice D: Dinosaur X, Dinosaur Y and Dinosaur Z - This response indicates the student may not have a clear understanding of multiplying two two-digit numbers, or has a clear understanding but lacks precision in his or her calculations. The length of the skeletons of Dinosaur X was 391 centimeters; Dinosaur Y was 306 centimeters and Dinosaur Z was 357 centimeters.

Answer options A, C, and D are plausible but incorrect. They represent common student errors when multiplying two two-digit numbers.

Which multiplication sentence can be used to calculate the total shaded area shown in the model below?



A $4 \times \frac{1}{8} = \underline{\quad ? \quad}$

B $8 \times \frac{1}{4} = \underline{\quad ? \quad}$

C $4 \times \frac{1}{6} = \underline{\quad ? \quad}$

D $6 \times \frac{1}{4} = \underline{\quad ? \quad}$

Key: A

Measured CCLS: 4.NF.4a

Commentary: The item measures 4.NF.4a because it asks the student to understand a visual fraction model of a whole number multiplied by a fraction and recognize how an equation represents the product.

Answer Choice A: $4 \times \frac{1}{8} = \underline{\quad ? \quad}$ - This response indicates a clear understanding of the use of a visual fraction model to represent a whole number multiplied by a fraction. The student recognizes that there are eight parts to each model with one part shaded, representing $\frac{1}{8}$. Since there are four models $4 \times \frac{1}{8}$ can be used to find the total shaded area.

Answer Choice B: $8 \times \frac{1}{4} = \underline{\quad ? \quad}$ - This response indicates the student may not have a clear understanding of the use of a visual fraction model to represent a whole number multiplied by a fraction. The student may recognize there are eight parts to each model but incorrectly uses eight as the whole number. The student may also attempt to incorporate the four models shown by incorrectly using $\frac{1}{4}$ as the fraction.

Answer Choice C: $4 \times \frac{1}{6} = \underline{\quad ? \quad}$ - This response may indicate a lack of precision. The student recognizes that there are several parts to each model with one part shaded. The student may have miscounted the number of parts and determined the fraction represented by the shaded region in one model is $\frac{1}{6}$. Since there are four models the student used $4 \times \frac{1}{6}$ to determine the total shaded area.

Answer Choice D: $6 \times \frac{1}{4} = \underline{\quad ? \quad}$ - This response indicates the student may not have a clear understanding of the use of a visual fraction model to represent a whole number multiplied by a fraction; this response may also show a lack of precision. The student likely recognizes there are several parts to each model, but miscounts the number of parts in each model as being six rather than eight and uses six as the whole number. The student also may attempt to incorporate the four models shown by incorrectly using $\frac{1}{4}$ as the fraction. The resulting multiplication of $6 \times \frac{1}{4}$ is then used to find the total shaded area.

Answer options B, C, and D are plausible but incorrect. They represent common student errors made when using a visual fraction model to represent a whole number multiplied by a fraction.

Rosa wrote a pattern using the rule “subtract 7.” The first two numbers in her pattern were 83 and 76. Which number below is part of Rosa’s pattern?

- A** 41
- B** 49
- C** 57
- D** 61

Key: A

Measured CCLS: 4.OA.5

Commentary: The item measures 4.OA.5 because it asks the student to generate a number pattern that follows a given rule and rewards recognition of key features of the pattern not explicitly stated in the given rule.

Answer Choice A: 41 - This response indicates a clear understanding of number patterns that arise from a rule; the student may have continued the pattern with precision. Or in continuing the pattern, the student may have recognized that each number in the pattern was 1 less than a factor of 7. Since 42 is a factor of 7, the correct response is 41.

Answer Choice B: 49 - This response shows a limited understanding of number patterns. The student may have been unable to continue the pattern of “subtract 7” with precision, which led to an incorrect result of 49. Or the student may have thought the pattern would include multiples of 7, because the rule is “subtract 7” and 49 is a multiple of 7.

Answer Choice C: 57 - This response indicates a limited understanding of number patterns and the features of the pattern generated. The student may have been unable to continue the pattern of “subtract 7” with precision, which led to an incorrect result of 57. Or without continuing the pattern, the student mistakenly articulated that each number in the pattern was 1 greater than a factor of 7 (instead of 1 less than a factor of 7). Since 56 is a factor of 7, the student response was 57.

Answer Choice D: 61 - This response indicates a limited understanding of number patterns. Most likely, the student attempted to continue the pattern. However, in the course of the continuation the student may have made a subtraction error (for example: $76 - 7 = 68$, $68 - 7 = 61$).

Answer options B, C, and D are plausible but incorrect. They indicate a limited understanding of number patterns.

A club's first meeting was attended by 28 people. The first meeting was attended by 4 times as many people as the second meeting. How many people attended the second meeting?

- A** 7
- B** 24
- C** 32
- D** 112

Key: A

Measured CCLS: 4.OA.2

Commentary: The item measures 4.OA.2 because it asks the student to divide to solve word problems involving multiplicative comparison; inherently, students must distinguish between word problems involving multiplicative comparison from those requiring additive comparison.

Answer Choice A: 7 - This response indicates a clear understanding of the multiplicative comparison between the number of people attending each meeting; the student is able to accurately divide to find the number of people attending the second meeting.

Answer Choice B: 24 - This response indicates the student may not have a clear understanding that the word problem is making a multiplicative comparison, rather than an additive comparison. As a result, the student may have subtracted to find the result of 24 people attending the second meeting.

Answer Choice C: 32 - This response indicates the student may not have a clear understanding that the word problem is making a multiplicative comparison, rather than an additive comparison. The student may have added to find the result of 32 people attending the second meeting.

Answer Choice D: 112 - This response indicates the student may not have a clear understanding of the multiplicative comparison between the numbers of people attending both meetings. Instead of dividing 28 by 4 to find the unknown factor, the student may have misinterpreted the multiplicative comparison, "4 times as many people," and multiplied 28 by 4 to get the result 112.

Answer options B, C, and D are plausible but incorrect. They represent common student errors that are made when dealing with multiplicative comparison.

In the number below, how many times greater is the number represented by the digit in the thousands place than the number represented by the digit in the hundreds place?

57,762

- A** 1
- B** 10
- C** 100
- D** 1,000

Key: B

Measured CCLS: 4.NBT.1

Commentary: The item measures 4.NBT.1 because it asks the student to recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.

Answer Choice A: 1 - This response indicates the student may not have a complete understanding of place value. The student may have selected 1 because the number 7 is in both the hundreds place and the thousands place, and thought the value of the digit in either location would be the same.

Answer Choice B: 10 - This response indicates a clear understanding of place value and the ability to apply concepts of place value and multiplicative comparison to recognize that a digit in one place represents ten times what it represents in the place to its right. The student either understands that $700 \times 10 = 7,000$ or $7,000 \div 700 = 10$.

Answer Choice C: 100 - This response indicates the student may not have a complete understanding of place value. The student may have selected 100 because the number 7 is in the hundreds place.

Answer Choice D: 1,000 - This response indicates the student may not have a complete understanding of place value. The student may have selected 1,000 because the 7 with a greater value is in the thousands place.

Answer options A, C, and D are plausible but incorrect. They indicate a limited understanding of place value.

Ms. Turner drove 825 miles in March. She drove 3 times as many miles in March as she did in January. She drove 4 times as many miles in February as she did in January. What was the total number of miles Ms. Turner drove in February?

- A** 1,100
- B** 1,925
- C** 5,775
- D** 9,900

Key: A

Measured CCLS: 4.OA.2, 4.OA.3

Commentary: The item measures 4.OA.2 because it asks the student to multiply and divide to solve a word problem involving multiplicative comparison. The item also measures 4.OA.3 because it is a multi-step word problem with whole numbers having a whole number answer.

Answer Choice A: 1,100 - This response indicates a clear understanding of the multiplicative comparison between the number of miles driven each month, with the student dividing to find the number of miles driven in January, and then multiplying to find the number of miles driven in February.

Answer Choice B: 1,925 - This response indicates the student may not have a clear understanding of solving a word problem involving multiplicative comparison. The student likely multiplied $825 \times 4 = 3,300$, and then divided $3,300 \div 3 = 1,100$, but then added 825 miles to find a total.

Answer Choice C: 5,775 - This response indicates the student may not have a clear understanding of the meaning of the multiplicative comparison expressed in the word problem. The student may have incorrectly multiplied $825 \times 3 = 3,300$ and $825 \times 4 = 2,475$, then added the products to find the result of 5,775.

Answer Choice D: 9,900 - This response indicates the student may not have a clear understanding of the multiplicative comparison between the number of miles driven each month. The student likely understands that a multiplicative comparison is being made, but multiplies the number of miles driven in March by 3, rather than dividing by 3, to get the number of miles driven in January. The student likely then multiplies the result by 4: $825 \times 3 = 2,475$; $2,475 \times 4 = 9,900$.

Answer options B, C, and D are plausible but incorrect. They represent common student errors that are made when dealing with multiplicative comparison.

A group of 6 people at an elementary school gave a total of \$1,890 to a town to fix up a playground. Each person gave the same amount.

At a middle school, 5 people each gave \$280 to the same town.

How much more did each person at the elementary school give than each person at the middle school?

Show your work.

Answer \$ _____

Measured CCLS: 4.NBT.6; 4.OA.3

Commentary: The item measures 4.NBT.6 because it asks the student to find whole-number quotients with a four-digit dividend and a one-digit divisor. The item also measures 4.OA.3 because it asks the student to solve multi-step word problems involving operations with whole-number answers.

Extended Rationale: The correct answer could be arrived at by first finding the amount of money each of the six people from the elementary school gave to the town by dividing the amount of money, \$1,890, by the number of people that gave: $1890 \div 6 = 315$.

The next step would be to subtract the amount of money given by each person at the middle school from the amount of money given by each person at the elementary school: $315 - 280 = 35$.

Each person at the elementary school gave \$35 more than each person at the middle school.

SAMPLE STUDENT RESPONSES AND SCORES APPEAR ON THE FOLLOWING PAGES:

A group of 6 people at an elementary school gave a total of \$1,890 to a town to fix up a playground. Each person gave the same amount.

At a middle school, 5 people each gave \$280 to the same town.

How much more did each person at the elementary school give than each person at the middle school?

Show your work.

$$\begin{array}{r} 2 \\ \cancel{3}15 \\ - 280 \\ \hline 35 \end{array}$$

$$\begin{array}{r} 315 \\ 6 \overline{)1890} \\ \underline{-18} \\ 09 \\ \underline{-6} \\ 30 \end{array}$$

Answer \$ 35.00

Score Point 2 (out of 2 points)

This response answers the question correctly and demonstrates a thorough understanding of the mathematical concepts. This response uses mathematically sound procedures ($1,890 \div 6$; $315 - 280$) to determine how much more each person at the elementary school gave (\$35).

A group of 6 people at an elementary school gave a total of \$1,890 to a town to fix up a playground. Each person gave the same amount.

At a middle school, 5 people each gave \$280 to the same town.

How much more did each person at the elementary school give than each person at the middle school?

Show your work.

1.
$$\begin{array}{r} \$315 \\ 6 \overline{) \$1,890} \\ \underline{18} \\ 09 \\ \underline{6} \\ 30 \end{array}$$

\rightarrow $\begin{array}{c} \$1,890 \\ \hline \boxed{a} \quad \boxed{a} \quad \boxed{a} \quad \boxed{a} \quad \boxed{a} \quad \boxed{a} \\ \hline \downarrow \qquad \qquad \downarrow \\ \$1,890 \div 6 = a \end{array}$ $a = \$315$

2. $\$315 - \$280 = a$

$\begin{array}{c} \downarrow \\ \begin{array}{|c|c|c|c|c|} \hline \$280 & \$280 & \$280 & \$280 & \$280 \\ \hline \end{array} \\ \begin{array}{|c|c|c|c|c|c|} \hline \$315 & \$315 & \$315 & \$315 & \$315 & \$315 \\ \hline \end{array} \end{array}$

Solve:

$$\begin{array}{r} \$315 \\ -\$280 \\ \hline \$035 \end{array}$$
 $a = \$35$

Each people from the elementary school gave \$35 more than each person from the Middle school.

Answer 5 35

Score Point 2 (out of 2 points)

This response answers the question correctly and demonstrates a thorough understanding of the mathematical concepts. This response uses mathematically sound procedures (both bar models and calculations) to determine how much more each person at the elementary school gave (\$35). The transcription error in the second elementary school bar model does not detract from the demonstration of a thorough understanding.

A group of 6 people at an elementary school gave a total of \$1,890 to a town to fix up a playground. Each person gave the same amount.

At a middle school, 5 people each gave \$280 to the same town.

How much more did each person at the elementary school give than each person at the middle school?

Show your work.

$$\begin{array}{r} 6 \\ \hline 1,890 \\ -1,800 \\ \hline 90 \\ -84 \\ \hline 6 \\ -6 \\ \hline 0 \end{array} \quad \begin{array}{r} 300 \\ +14 \\ +1 \\ \hline \$315 \end{array}$$

$$\begin{array}{r} \$315 \\ -\$280 \\ \hline 35 \end{array}$$

Answer \$

35

Score Point 2 (out of 2 points)

This response answers the question correctly and demonstrates a thorough understanding of the mathematical concepts. This response uses mathematically sound procedures (the partial quotient method to calculate $1,890 \div 6$; $315 - 280$) to determine out how much more each person at the elementary school gave (\$35).

A group of 6 people at an elementary school gave a total of \$1,890 to a town to fix up a playground. Each person gave the same amount.

At a middle school, 5 people each gave \$280 to the same town.

How much more did each person at the elementary school give than each person at the middle school?

Show your work.

$$\begin{array}{r} 6 \overline{) 1890} \\ \underline{1800} \\ 90 \\ \underline{60} \\ 30 \\ \underline{30} \\ 00 \end{array}$$

$$\begin{array}{r} 300 \\ 10 \\ \underline{5} \\ 315 \end{array}$$

$$\begin{array}{l} \text{Elementary : } 315 \\ \text{Middle : } \underline{280} \\ 25 \end{array}$$

$$\begin{array}{r} 280 \\ \times 5 \\ \hline 1400 \\ 000 \\ \hline 14000 \end{array}$$

Answer 5 25.00

Score Point 1 (out of 2 points)

This response is only partially correct. The response applies a mathematically appropriate process ($\$1,890 \div 6$; $315 - 280$); however, a subtraction error results in an incorrect answer (\$25).

A group of 6 people at an elementary school gave a total of \$1,890 to a town to fix up a playground. Each person gave the same amount.

At a middle school, 5 people each gave \$280 to the same town.

How much more did each person at the elementary school give than each person at the middle school?

Show your work.

$$\begin{array}{r} 4 \\ \$280 \\ \times \quad 5 \\ \hline 1400 \end{array}$$

$$\begin{array}{r} \$315 \\ \hline 6 \overline{)1890} \\ \underline{-18} \\ 09 \\ \underline{-6} \\ 30 \\ \underline{-30} \\ 0 \end{array}$$

Answer 3

315

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts. This response uses a mathematically sound procedure ($\$1,890 \div 6 = \315) to determine the amount each person at the elementary school gave. However, the response does not determine the difference between 315 and 280. Calculating the total amount given by the people at the middle school does not enhance nor detract from the quality of the response.

Additional

A group of 6 people at an elementary school gave a total of \$1,890 to a town to fix up a playground. Each person gave the same amount.

At a middle school, 5 people each gave \$280 to the same town.

How much more did each person at the elementary school give than each person at the middle school?

Show your work.

$$\begin{array}{r} 56 \\ 5 \overline{) 280} \\ \underline{25} \\ 030 \\ \underline{30} \\ 0 \end{array}$$

$$\begin{array}{r} \text{elementary school} = 315 \\ \text{middle school} = 56 \\ \hline 259 \end{array}$$

$$\begin{array}{r} 315 \\ 6 \overline{) 1,890} \\ \underline{18} \\ 09 \\ \underline{6} \\ 30 \\ \underline{30} \\ 0 \end{array}$$

Answer \$ 259

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts. This response uses a mathematically sound procedure ($\$1,890 \div 6 = \315) to determine the amount given by each person at the elementary school. However, an incorrect procedure of dividing 280 by 5 results in an incorrect component for determining the difference in gift amounts ($\$315 - 56 = 259$), which results in an incorrect answer.

A group of 6 people at an elementary school gave a total of \$1,890 to a town to fix up a playground. Each person gave the same amount.

At a middle school, 5 people each gave \$280 to the same town.

How much more did each person at the elementary school give than each person at the middle school?

Show your work.

$$\begin{array}{r} 1,890 \\ -1,400 \\ \hline \$490 \end{array}$$

$$\begin{array}{r} 280 \\ \times 5 \\ \hline 1,400 \end{array}$$

The elementary gave more money to the town than the middle school.

Answer \$

490

Score Point 0 (out of 2 points)

This response is irrelevant. This response compares the difference between the two groups instead of the individual donors. Although the calculations are correct, holistically, this work is not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task.

Additional

A group of 6 people at an elementary school gave a total of \$1,890 to a town to fix up a playground. Each person gave the same amount.

At a middle school, 5 people each gave \$280 to the same town.

How much more did each person at the elementary school give than each person at the middle school?

Show your work.

$$\begin{array}{r}
 \begin{array}{r}
 \overset{5}{\$1,890} \\
 \times \quad \quad \quad \overset{6}{6} \\
 \hline
 \$11,340
 \end{array}
 \qquad
 \begin{array}{r}
 \overset{0}{\$11,340} \\
 - \overset{13}{\$1,400} \\
 \hline
 \$10,940
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 \overset{4}{\$280} \\
 \times \quad \quad \quad \overset{5}{5} \\
 \hline
 \$1,400
 \end{array}
 \qquad
 \$10,940$$

Answer 5 10,940

Score Point 0 (out of 2 points)

This response is irrelevant. This response answers with the difference between the product of \$1,890 and 6 and the product of \$280 and 5 ($\$11,340 - \$1,400 = \$10,940$), two incorrect procedures. Although the calculations are completed correctly, holistically, this work is not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task.

A builder planned to build houses. Each house will be built on $\frac{5}{6}$ of an acre.
How much land would be needed for 7 houses?

Show your work.

Answer _____ acres

The builder began with 10 acres of land. After 7 houses were built, how much land was left unused?

Answer _____ acres

Measured CCLS: 4.NF.4c; 4.NF.3d

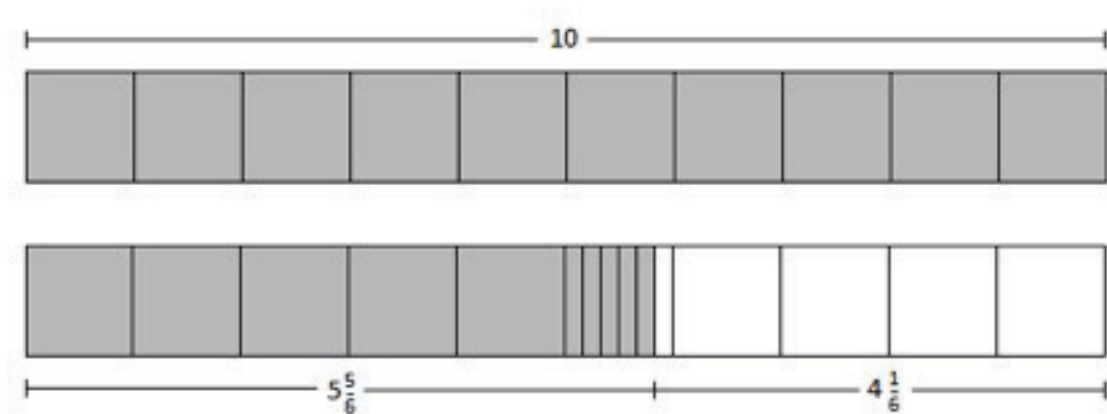
Commentary: The item measures 4.NF.4c because it asks the student to solve a word problem involving multiplication of a fraction by a whole number. The item also measures 4.NF.3d because it asks the student to solve word problems involving the subtraction of fractions.

Extended Rationale: The correct answer to the first part of the item could be arrived at by multiplying the number of acres needed for one house by the number of houses that will be built: $\frac{5}{6} \times 7 = \frac{35}{6} = 5\frac{5}{6}$ acres.

Another approach could be repeated addition. The number of acres needed for seven houses could also be achieved by adding $\frac{5}{6}$ seven times: $\frac{5}{6} + \frac{5}{6} + \frac{5}{6} + \frac{5}{6} + \frac{5}{6} + \frac{5}{6} + \frac{5}{6} = \frac{35}{6} = 5\frac{5}{6}$.

After finding the amount of land needed for seven houses the student would subtract this amount from 10. The student may convert the whole number 10 to a mixed number with a denominator of 6: $9\frac{6}{6} - 5\frac{5}{6} = 4\frac{1}{6}$.

A student could also use a visual fraction model to compare $5\frac{5}{6}$ with 10:



SAMPLE STUDENT RESPONSES AND SCORES APPEAR ON THE FOLLOWING PAGES:

Additional

A builder planned to build houses. Each house will be built on $\frac{5}{6}$ of an acre.
How much land would be needed for 7 houses?

Show your work.

$$\frac{5}{6} \times 7 = \frac{35}{6}$$
$$6 \overline{)35} \begin{array}{r} 5 \frac{5}{6} \\ -30 \\ \hline 5 \end{array}$$

Answer $5 \frac{5}{6}$ acres

The builder began with 10 acres of land. After 7 houses were built, how much land was left unused?

Answer $4 \frac{1}{6}$ acres

Score Point 2 (out of 2 points)

This response answers the question correctly and demonstrates a thorough understanding of the mathematical concepts. In the first part, a sound mathematical procedure ($\frac{5}{6} \times 7$) is used, all necessary work is shown, and the answer is correct. The second answer is also correct.

A builder planned to build houses. Each house will be built on $\frac{5}{6}$ of an acre.
 How much land would be needed for 7 houses?

Show your work.

$$\begin{array}{r}
 \frac{5}{6} \\
 \frac{5}{6} \\
 \frac{5}{6} \\
 \frac{5}{6} \\
 \frac{5}{6} \\
 \frac{5}{6} \\
 \frac{5}{6} \\
 + \frac{5}{6} \\
 \hline
 \frac{35}{6} = 5 \frac{5}{6}
 \end{array}$$

Answer 5 $\frac{5}{6}$ acres

The builder began with 10 acres of land. After 7 houses were built, how much land was left unused?

Answer 4 $\frac{1}{6}$ acres

Score Point 2 (out of 2 points)

This response answers the question correctly and indicates that the student has completed the task using mathematically sound procedures. In the first part, a sound mathematical procedure ($\frac{5}{6} + \frac{5}{6} + \frac{5}{6} + \frac{5}{6} + \frac{5}{6} + \frac{5}{6} + \frac{5}{6}$) is used, all necessary work is shown, and the answer is correct. The second answer is also correct.

A builder planned to build houses. Each house will be built on $\frac{5}{6}$ of an acre.
How much land would be needed for 7 houses?

Show your work.

$$\begin{array}{r} \frac{5}{6} \\ \times 7 \\ \hline \frac{35}{6} \end{array}$$

Answer $\frac{35}{6}$ acres

The builder began with 10 acres of land. After 7 houses were built, how much land was left unused?

Answer $\frac{25}{6}$ acres

$$\begin{array}{r} \frac{35}{6} \\ - 10 \\ \hline \frac{25}{6} \end{array}$$

Score Point 2 (out of 2 points)

This response answers the question correctly and demonstrates a thorough understanding of the mathematical concepts. In the first part, an appropriate mathematical process ($\frac{5}{6} \times 7$) is used, all necessary work is shown, and the answer is correct. The second answer is also correct.

A builder planned to build houses. Each house will be built on $\frac{5}{6}$ of an acre.
 How much land would be needed for 7 houses?

Show your work.

$$\begin{array}{r} \frac{5}{6} \\ + \frac{5}{6} \\ \hline \frac{10}{12} \\ \frac{5}{6} \\ \hline \frac{15}{6} \\ \frac{5}{6} \\ \hline \frac{20}{6} \\ \frac{5}{6} \\ \hline \frac{25}{6} \\ \frac{5}{6} \\ \hline \frac{30}{6} \end{array}$$

Answer 5 $\frac{5}{6}$ acres
(12, 18, 24, 30)

$$\begin{array}{r} \frac{5}{6} \\ + \frac{5}{6} \\ \hline \frac{10}{12} \\ \frac{5}{6} \\ \hline \frac{15}{6} \\ \frac{5}{6} \\ \hline \frac{20}{6} \\ \frac{5}{6} \\ \hline \frac{25}{6} \\ \frac{5}{6} \\ \hline \frac{30}{6} \end{array} \quad \boxed{5 \frac{5}{6}}$$

The builder began with 10 acres of land. After 7 houses were built, how much land was left unused?

$$\begin{array}{r} 10 \\ - \frac{5}{6} \\ \hline 9 \frac{5}{6} \\ \frac{5}{6} \\ \hline 9 \end{array}$$

Answer 3 acres

Score Point 1 (out of 2 points)

This response is only partially correct; it correctly addresses some elements of the task. In the first part, an appropriate mathematical process is used ($\frac{5}{6} + \frac{5}{6} + \frac{5}{6} = \frac{15}{6}$; $\frac{15}{6} + \frac{5}{6} + \frac{5}{6} + \frac{5}{6} + \frac{5}{6} = \frac{35}{6}$), all necessary work is shown, and the answer is correct. The second answer is incorrect.

A builder planned to build houses. Each house will be built on $\frac{5}{6}$ of an acre.
How much land would be needed for 7 houses?

Show your work.

$$\begin{array}{r} 5 \\ +5 \\ \hline 10 \end{array} \quad \begin{array}{r} 10 \\ -6 \\ \hline 4 \end{array}$$

Answer 5 $\frac{5}{6}$ acres

The builder began with 10 acres of land. After 7 houses were built, how much land was left unused?

Answer 4 $\frac{1}{6}$ acres

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts. In the first part, although the answer in the answer blank is correct, no work is shown that results in the given answer. In the second part, work is not required and the answer is correct.

A builder planned to build houses. Each house will be built on $\frac{5}{6}$ of an acre.
How much land would be needed for 7 houses?

Show your work.

$$\frac{5}{6} + \frac{5}{6} = \frac{10}{12} + \frac{10}{12} = \frac{20}{24}$$

$$\frac{20}{24} + \frac{10}{12} = \frac{30}{36} \quad \frac{30}{36} + \frac{5}{6} = \frac{35}{42}$$

Answer $\frac{35}{42}$ acres

The builder began with 10 acres of land. After 7 houses were built, how much land was left unused?

Answer 3 acres

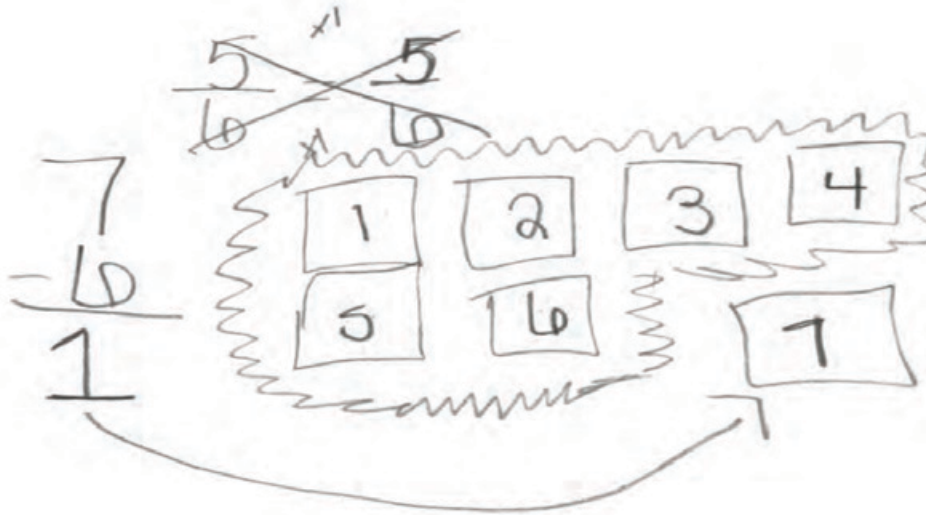
Score Point 0 (out of 2 points)

This response is incorrect. While the process of adding the space seven times is an appropriate process for this type of problem, a lack of understanding of the procedure for adding fractions is demonstrated and the answer is incorrect. The second answer is also incorrect. Holistically, this is not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task.

Additional

A builder planned to build houses. Each house will be built on $\frac{5}{6}$ of an acre.
 How much land would be needed for 7 houses?

Show your work.



Answer 7 acres

The builder began with 10 acres of land. After 7 houses were built, how much land was left unused?

Answer 3 acres $\frac{10}{-7} = 3$

Score Point 0 (out of 2 points)

This response is incorrect. An incorrect procedure is used and both answers are incorrect.

Pete painted $\frac{4}{8}$ of a rectangle green. He painted $\frac{1}{8}$ of the same rectangle blue. Pete painted the rest of the rectangle red. What fraction of the rectangle did Pete paint red?

Answer _____

Show or explain how you got your answer.

Draw a rectangle to model the amount of each color Pete used. Divide the rectangle into equal parts, and label the parts G for green, B for blue, and R for red.

Measured CCLS: 4.NF.3d

Commentary: The item measures 4.NF.3d and asks the student to solve a word problem that involves addition and subtraction of fractions referring to the same whole and having like denominators.

Extended Rationale: The correct answer is determined by first adding $\frac{4}{8} + \frac{1}{8} = \frac{5}{8}$ to show the fraction of the rectangle that is green and blue; and then subtracting $\frac{5}{8}$ from $\frac{8}{8}$ because the sum of all the parts must equal $\frac{8}{8}$ or 1. As a result, $\frac{3}{8}$ of the rectangle remains for Pete to paint red.

To show or explain the answer, a student would include the work done to solve the problem or explain the process in words, as above.

Finally, a variety of rectangles could be drawn to model the amount of color Pete used:

G	G	B	R
G	G	R	R

OR

G	G	G	G	B	R	R	R
---	---	---	---	---	---	---	---

OR

A rectangle divided into eight equal regions with four regions marked "G", three regions marked "R" and one region marked "B".

SAMPLE STUDENT RESPONSES AND SCORES APPEAR ON THE FOLLOWING PAGES:

Pete painted $\frac{4}{8}$ of a rectangle green. He painted $\frac{1}{8}$ of the same rectangle blue.
 Pete painted the rest of the rectangle red. What fraction of the rectangle did
 Pete paint red?

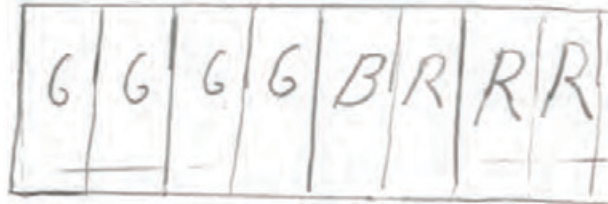
Answer $\frac{3}{8}$

$$\frac{4}{8} + \frac{1}{8} = \frac{5}{8} + \frac{3}{8} = \frac{8}{8}$$

Show or explain how you got your answer.

I got my answer by first doing $\frac{4}{8} + \frac{1}{8} = \frac{5}{8}$, then I did $\frac{5}{8} + \frac{3}{8}$ which equals $\frac{8}{8}$, so $\frac{3}{8}$ is the part that got colored red.

Draw a rectangle to model the amount of each color Pete used. Divide the rectangle into equal parts, and label the parts G for green, B for blue, and R for red.



Score Point 3 (out of 3 points)

This response answers the question correctly and demonstrates a thorough understanding of the mathematical concepts. The answer ($\frac{3}{8}$), explanation ($\frac{4}{8} + \frac{1}{8} = \frac{5}{8}$ then I did $\frac{5}{8} + \frac{3}{8}$ which equals $\frac{8}{8}$), and model are all correct. The incorrect mathematical statement ($\frac{4}{8} + \frac{1}{8} = \frac{5}{8} + \frac{3}{8} = \frac{8}{8}$) does not detract from the demonstration of a thorough understanding.

Pete painted $\frac{4}{8}$ of a rectangle green. He painted $\frac{1}{8}$ of the same rectangle blue. Pete painted the rest of the rectangle red. What fraction of the rectangle did Pete paint red?

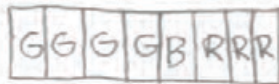
Answer $\frac{3}{8}$ red

$$\begin{array}{r} 4/8 \\ - 1/8 \\ \hline 3/8 \end{array}$$

Show or explain how you got your answer.

I got my answer by drawing a rectangle and 7 equal lines. Then I labeled the first four green, 1 blue and the rest red. Which is $\frac{3}{8}$.

Draw a rectangle to model the amount of each color Pete used. Divide the rectangle into equal parts, and label the parts G for green, B for blue, and R for red.



Score Point 3 (out of 3 points)

This response answers the question correctly and demonstrates a thorough understanding of the mathematical concepts. The answer ($\frac{3}{8}$ red), explanation (labeled the first four green, one blue and the rest red), and model are all correct.

Additional

Pete painted $\frac{4}{8}$ of a rectangle green. He painted $\frac{1}{8}$ of the same rectangle blue. Pete painted the rest of the rectangle red. What fraction of the rectangle did Pete paint red?



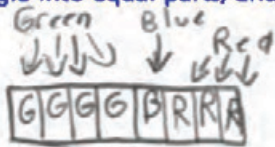
$$\frac{4}{8} + \frac{1}{8} = \frac{5}{8}$$
$$\frac{8}{8} - \frac{5}{8} = \frac{3}{8}$$

Answer $\frac{3}{8}$

Show or explain how you got your answer.

Pete colored $\frac{4}{8}$ green and $\frac{1}{8}$ blue, so that equals $\frac{5}{8}$. $\frac{8}{8} - \frac{5}{8} = \frac{3}{8}$, so the rest of the circle would be colored red. $\frac{3}{8}$ are colored red.

Draw a rectangle to model the amount of each color Pete used. Divide the rectangle into equal parts, and label the parts G for green, B for blue, and R for red.



Score Point 3 (out of 3 points)

This response answers the question correctly and demonstrates a thorough understanding of the mathematical concepts. The answer ($\frac{3}{8}$), explanation ($\frac{8}{8} - \frac{5}{8} = \frac{3}{8}$), and model are all correct. The task has been completed correctly using mathematically sound procedures.

Pete painted $\frac{4}{8}$ of a rectangle green. He painted $\frac{1}{8}$ of the same rectangle blue.
Pete painted the rest of the rectangle red. What fraction of the rectangle did
Pete paint red?

Answer $\frac{3}{8}$

Show or explain how you got your answer.

Well first I did the rectangle below and drew 8
boxes then I colored 5 then I counted how
many I had left.

Draw a rectangle to model the amount of each color Pete used. Divide the
rectangle into equal parts, and label the parts G for green, B for blue, and R for
red.



Score Point 2 (out of 3 points)

This response demonstrates partial understanding of the mathematical concepts and procedures embodied in the task. The answer ($\frac{3}{8}$) and explanation are correct; however, the model is not labeled.

Pete painted $\frac{4}{8}$ of a rectangle green. He painted $\frac{1}{8}$ of the same rectangle blue. Pete painted the rest of the rectangle red. What fraction of the rectangle did Pete paint red?

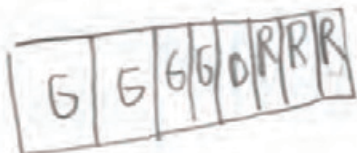
Answer 3

$$\begin{array}{r} 8 \\ - 5 \\ \hline 3 \end{array}$$

Show or explain how you got your answer.

I got my answer by subtracting 5 from 8.

Draw a rectangle to model the amount of each color Pete used. Divide the rectangle into equal parts, and label the parts G for green, B for blue, and R for red.



Score Point 1 (out of 3 points)

This response is incomplete and demonstrates only a limited understanding of the mathematical concepts and procedures embodied in the task. The answer (3) is incorrect and the explanation lacks specificity, such as showing work using fractions or describing how the model was used. The model, however, is correct.

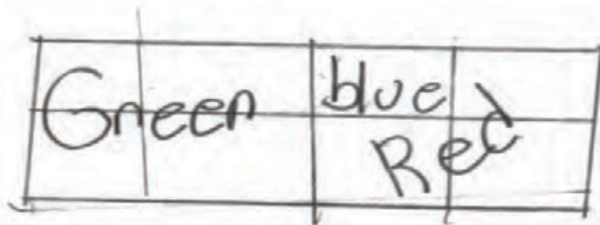
Pete painted $\frac{4}{8}$ of a rectangle green. He painted $\frac{1}{8}$ of the same rectangle blue.
Pete painted the rest of the rectangle red. What fraction of the rectangle did
Pete paint red?

Answer 3

Show or explain how you got your answer.

I just did $4+1$ and I got
5 so then in my head
I did $8-5$ and I got 3

Draw a rectangle to model the amount of each color Pete used. Divide the rectangle into equal parts, and label the parts G for green, B for blue, and R for red.



Score Point 1 (out of 3 points)

This response is incomplete and demonstrates only a limited understanding of the mathematical concepts and procedures embodied in the task. The answer (3) is incorrect, and the explanation is incomplete. The model, however, is correct.

Additional

Pete painted $\frac{4}{8}$ of a rectangle green. He painted $\frac{1}{8}$ of the same rectangle blue. Pete painted the rest of the rectangle red. What fraction of the rectangle did Pete paint red?

$$\frac{4}{8} + \frac{1}{8} = \frac{5}{8}$$

Answer $\frac{5}{8}$

Show or explain how you got your answer.

I got my answer by adding what he had painted and my answer is $\frac{5}{8}$

Draw a rectangle to model the amount of each color Pete used. Divide the rectangle into equal parts, and label the parts G for green, B for blue, and R for red.



Score Point 1 (out of 3 points)

This response is incomplete and demonstrates only a limited understanding of the mathematical concepts and procedures embodied in the task. The answer and explanation are incorrect; however, the model is correct.

Additional

Pete painted $\frac{4}{8}$ of a rectangle green. He painted $\frac{1}{8}$ of the same rectangle blue.
Pete painted the rest of the rectangle red. What fraction of the rectangle did
Pete paint red?

Answer $\frac{1}{8}$

Show or explain how you got your answer.

$\frac{1}{8}$ was closer to what it said
pete painted.

Draw a rectangle to model the amount of each color Pete used. Divide the
rectangle into equal parts, and label the parts G for green, B for blue, and R for
red.



Score Point 0 (out of 3 points)

This response is incorrect and not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task. The answer and explanation are incorrect. In addition, while the blue and green squares are labeled correctly, the red squares are incorrect for both the specific item requirements and the answer provided.