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New York State Testing Program
Grade 5 Common Core
Mathematics Test

Released Questions with Annotations

August 2014

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Mathematics Test

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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. Starting in Spring 2013, New York State began administering 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 assessments, New York State has released a number of resources, including test blueprints and specifications, sample questions, and criteria for writing assessment questions. These resources can be found at http://www.engageny.org/common-core-assessments.

New York State administered the ELA/Literacy and Mathematics Common Core tests in April 2014 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 educators, students, families, and the public understand how the Common Core is different. The annotated questions 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 question 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 question 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 in the Educator Guide to the 2014 Grade 5 Common Core Mathematics Test at www.engageny.org/resource/test-guides-for-english-language-arts-and-mathematics.

Short Response

Short-response questions require 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 ask 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 assessment information is available at www.engageny.org/common-core-assessments.

Which statement is true about the values of the two expressions below?

> Expression A: $3 \times (8 + 4)$
> Expression B: $8 + 4$

A The value of Expression B is three times the value of Expression A.

B The value of Expression A is three times the value of Expression B.

C The value of Expression A is three more than the value of Expression B.

D The value of Expression B is three more than the value of Expression A.

Key: B
Measured CCLS: 5.OA.2

Commentary: This question measures 5.OA.2 by asking the student to interpret numerical expressions; evaluating the given expressions is not necessary.

Extended Rationale

Answer Choice A: "The value of Expression B is three times the value of Expression A." This response may reflect an error in distinguishing between the two expressions. The student may have confused Expression A with Expression B. The student who selects this response may not understand how to interpret numerical expressions without evaluating them.

Answer Choice B: "The value of Expression A is three times the value of Expression B." This is the correct interpretation of Expression A and Expression B. The student may have understood that multiplying the expression $8 + 4$ by 3 would make it 3 times as great as the original expression. The student who selects this response understands how to interpret numerical expressions without evaluating them.

Answer Choice C: "The value of Expression A is three more than the value of Expression B." This response may reflect an error in interpreting multiplication in Expression A. The student may have thought that the multiplication sign in Expression A meant "3 more than" rather than "3 times" the value of Expression B. The student who selects this response may not understand how to interpret numerical expressions without evaluating them.

Answer Choice D: "The value of Expression B is three more than the value of Expression A." This response may reflect an error in distinguishing between the two expressions and in interpreting multiplication in Expression A. The student may have confused Expression A with Expression B and also may have thought that the multiplication sign in Expression A meant "3 more than" rather than "3 times" the value of Expression B. The student who selects this response may not understand how to interpret numerical expressions without evaluating them.

Answer choices A, C, and D are plausible but incorrect. They represent common student errors made when interpreting numerical expressions without evaluating them.

Which diagram represents a volume of one cubic unit?

A

1 unit

1 unit

B

2 units

2 units

C

2 units

2 units   2 units

D

1 unit

1 unit   1 unit
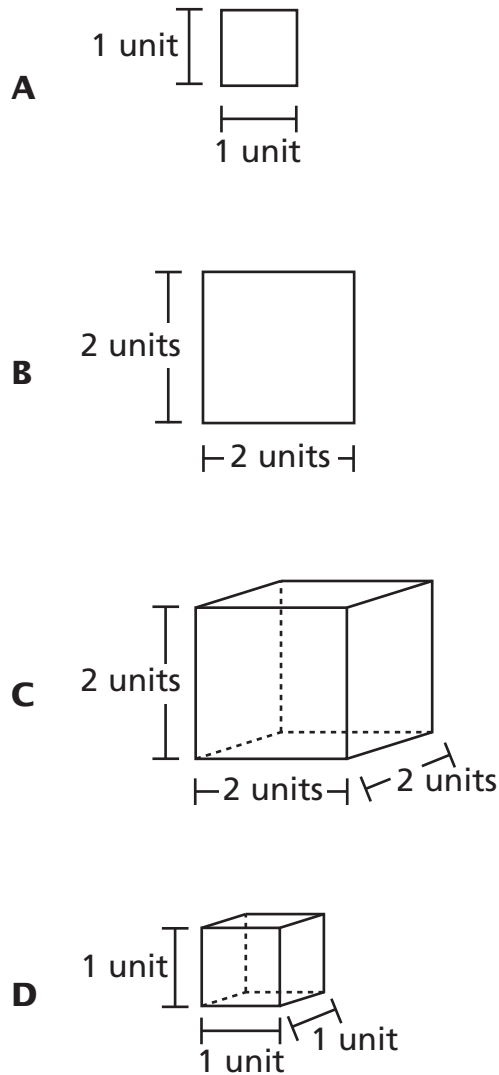
Key: D
Measured CCLS: 5.MD.3.a

Commentary: This question measures 5.MD.3.a by asking the student to recognize that a cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume.

Extended Rationale

Answer Choice A: This response may reflect a lack of understanding of the definition of a unit cube. The student may have confused the definition of a unit square with the definition of a unit cube. The student who selects this response may not understand that a cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume.

Answer Choice B: This response may reflect a lack of understanding of the definition of a unit cube. The student may have confused volume with area and thought that a square of any size could be called a unit square or did not understand that "cubic" refers to a cube rather than a square. The student who selects this response may not understand that a cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume.

Answer Choice C: This response may reflect a lack of understanding of the definition of a unit cube. The student may have thought that a cube of any size could be called a unit cube. The student who selects this response may not understand that a cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume.

Answer Choice D: This is the correct response that shows a diagram that represents 1 cubic unit. The student who selects this response understands that a cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume.

Answer choices A, B, and C are plausible but incorrect. They represent common student errors made when recognizing that a cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume.

Which phrase describes the volume of a 3-dimensional figure?

A the number of square units it takes to fill a solid figure

B the number of cubic units it takes to fill a solid figure

C the number of square units it takes to cover the outside of a solid figure

D the number of cubic units it takes to cover the outside of a solid figure

Key: B
Measured CCLS: 5.MD.3b

Commentary: The question measures 5.MD.3b because it asks the student to recognize that a solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units. The student is asked to identify the phrase that describes the volume of a 3-dimensional figure.

Extended Rationale

Answer Choice A: "the number of square units it takes to fill a solid figure"; This response may reflect a partial understanding of the concept of volume of a solid figure. A student who selects this response may recognize that volume is a characteristic associated with filling a solid figure but may have confused square units with cubic units as the measure of volume.

Answer Choice B: "the number of cubic units it takes to fill a solid figure"; This is the correct description of the volume of a solid figure as the number of cubic units that it takes to fill the figure. A student who selects this response understands that a solid figure, which can be packed without gaps or overlaps using n unit cubes, is said to have a volume of n cubic units.

Answer Choice C: "the number of square units it takes to cover the outside of a solid figure"; This response may reflect a misunderstanding of the concept of volume of a solid figure. A student who selects this response may not recognize that volume is measured in cubic units instead of square units and may confuse the concept of volume with the concept of area.

Answer Choice D: "the number of cubic units it takes to cover the outside of a solid figure"; This response may reflect a partial understanding of the concept of volume of a solid figure. A student who selects this response may recognize that volume is measured in cubic units but may confuse the concept of volume with the concept of area.

Answer choices A, C, and D are plausible but incorrect. They represent common student misunderstandings when recognizing how to represent the volume of a solid figure in terms of the number of unit cubes that it takes to fill the figure.

A recipe for 1 batch of muffins included $\frac{2}{3}$ cup of raisins. Ina made $2\frac{1}{2}$ batches of muffins. How many cups of raisins did she use?

A $1\frac{4}{6}$

B $1\frac{5}{6}$

C $2\frac{2}{6}$

D $3\frac{1}{6}$

Key: A
Measured CCLS: 5.NF.6

Commentary: This question measures 5.NF.6 by asking the student to solve a real-world problem involving multiplication of fractions and mixed numbers.

Extended Rationale

Answer Choice A: "$1\frac{4}{6}$"; This is the correct number of cups of raisins Ina used. The student may have understood how to multiply a mixed number and a fraction by converting the mixed number into a fraction greater than one, $\frac{5}{2} \times \frac{2}{3} = \frac{10}{6}$, and then converting the fraction back into a mixed number, $\frac{10}{6} = 1\frac{4}{6}$. The student who selects this response understands how to multiply mixed numbers and fractions.

Answer Choice B: "$1\frac{5}{6}$"; This response may reflect a lack of understanding of multiplying fractions and mixed numbers. The student may have multiplied the whole number 2 by $\frac{2}{3}$ and then added $\frac{1}{2}$, $(\frac{2}{1} \times \frac{2}{3}) + \frac{1}{2} = 1\frac{5}{6}$. The student who selects this response may not fully understand how to multiply fractions and mixed numbers.

Answer Choice C: "$2\frac{2}{6}$"; This response may reflect a lack of understanding of multiplying fractions and mixed numbers. The student may have multiplied the fractional part of the mixed number by $\frac{2}{3}$ and then added 2: $\frac{1}{2} \times \frac{2}{3} = \frac{2}{6}$ and $\frac{2}{6} + 2 = 2\frac{2}{6}$. The student who selects this response may not fully understand how to multiply mixed numbers and fractions.

Answer Choice D: "$3\frac{1}{6}$"; This response may reflect an error in interpreting the problem situation. The student may have added the mixed number and the fraction, $2\frac{1}{2} + \frac{2}{3} = 3\frac{1}{6}$, instead of multiplying them. The student who selects this response may not understand how to interpret the real-world problem.

Answer choices B, C, and D are plausible but incorrect. They represent common student errors made when solving a real-world problem involving multiplication of fractions and mixed numbers.

Mani, James, and Isidro equally shared $\frac{1}{2}$ of a pie. Which fraction of the whole pie did each of them receive?

A $\quad \frac{1}{6}$

B $\quad \frac{1}{5}$

C $\quad \frac{2}{3}$

D $\quad \frac{3}{2}$

Key: A
Measured CCLS: 5.NF.7.C

Commentary: This question measures 5.NF.7.C by asking the student to solve real-world problems involving division of unit fractions by non-zero whole numbers.

Extended Rationale

Answer Choice A: "$\frac{1}{6}$"; This is the correct fraction of the whole pie that each person received. The student may have understood dividing a fraction by 3 as multiplying by $\frac{1}{3}$, $\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$. The student who selects this response understands how to solve real-world problems involving division of unit fractions by non-zero whole numbers.

Answer Choice B: "$\frac{1}{5}$"; This response may reflect an error in multiplying fractions. The student may have understood that $\frac{1}{3}$ could be involved in the computation but incorrectly added instead of multiplying, $\frac{1}{2} + \frac{1}{3} = \frac{1}{5}$. The student who selects this response may not understand how to solve real-world problems involving division of unit fractions by non-zero whole numbers.

Answer Choice C: "$\frac{2}{3}$"; This response may reflect an error in dividing fractions. The student may have understood dividing a fraction by 3 as multiplying by $\frac{1}{3}$ but incorrectly assumed that it should also involve multiplying by $\frac{2}{1}$: $\frac{2}{1} \times \frac{1}{3} = \frac{2}{3}$. The student who selects this response may not understand how to divide unit fractions by non-zero whole numbers.

Answer Choice D: "$\frac{3}{2}$"; This response may reflect a lack of understanding of dividing fractions. The student may not have understood the difference between the processes of multiplication and division of fractions or may not have understood that this real-world problem should be solved using division of fractions. The student who selects this response may not understand how to solve real-world problems involving division of unit fractions by non-zero whole numbers.

Answer choices B, C, and D are plausible but incorrect. They represent common student errors made when solving real-world problems involving division of unit fractions by non-zero whole numbers.

A number is given below.

136.25

In a different number, the 6 represents a value which is one-tenth of the value of the 6 in the number above. What value is represented by the 6 in the other number?

A six hundredths

B six tenths

C six ones

D six tens

Key: B
Measured CCLS: 5.NBT.1

Commentary: This question measures 5.NBT.1 by asking the student to recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left.

Extended Rationale

Answer Choice A: "six hundredths"; This response may reflect a lack of understanding of place value. The student may have confused the hundredths place and the tenths place or misunderstood the patterns in the decimal point when multiplying or dividing by ten. The student who selects this response may not understand how to determine the values of digits in the decimal places.

Answer Choice B: "six tenths"; This is the correct value that is represented by the 6 in the other number. The student who selects this response understands that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left.

Answer Choice C: "six ones"; This response may reflect a lack of understanding of place value. The student may have thought that a digit of 6 will always represent 6 ones. The student who selects this response may not understand that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left.

Answer Choice D: "six tens"; This response may reflect a lack of understanding of place value. The student may have confused tens with tenths. The student who selects this response may not understand place value or how to determine the values of digits in the decimal places.

Answer choices A, C, and D are plausible but incorrect. They represent common student errors made when recognizing that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left.

Austin collected $30\frac{9}{10}$ kilograms of glass for recycling. Exactly $\frac{2}{3}$ of the glass he collected was blue. What was the total amount, in kilograms, of blue glass Austin collected?

A $20\frac{3}{5}$

B $27\frac{2}{3}$

C $30\frac{3}{5}$

D $30\frac{11}{13}$

Key: A
Measured CCLS: 5.NF.6

Commentary: This question measures 5.NF.6. by asking the student to solve a real-world problem involving multiplication of fractions and mixed numbers.

Extended Rationale

Answer Choice A: "$20\frac{3}{5}$"; This is the correct result when $30\frac{9}{10}$ is multiplied by $\frac{2}{3}$. The student may have understood how to convert $30\frac{9}{10}$ to a fraction greater than 1, $\frac{309}{10}$, and then multiply, $\frac{309}{10} \times \frac{2}{3} = \frac{618}{30}$. Then the student may have understood how to convert the resulting fraction to a mixed number, $\frac{618}{30} = 20\frac{18}{30} = 20\frac{3}{5}$. The student who selects this response understands how to solve real-world problems involving multiplication of fractions and mixed numbers.

Answer Choice B: "$27\frac{2}{3}$"; This response may reflect an incomplete understanding of multiplying fractions and mixed numbers. The student may have calculated incorrectly, $\frac{30 \times 9}{10} = 27$ and then added $\frac{2}{3}$ to get a total of $27\frac{2}{3}$. The student who selects this response may not understand how to multiply fractions and mixed numbers to solve real-world problems.

Answer Choice C: "$30\frac{3}{5}$"; This response may reflect a lack of understanding of multiplying fractions and mixed numbers. The student may have correctly calculated $\frac{9 \times 2}{10 \times 3} = \frac{18}{30} = \frac{3}{5}$, without also multiplying $\frac{2}{3}$ times 30, leading to an answer of $30\frac{3}{5}$. The student who selects this response may not understand how to multiply fractions and mixed numbers to solve real-world problems.

Answer Choice D: "$30\frac{11}{13}$"; This response may reflect a lack of understanding of solving real-world problems involving fractions and mixed numbers. The student may have thought that the operation needed was addition and then calculated incorrectly, $30\frac{9+2}{10+3} = 30\frac{11}{13}$. The student who selects this response may not understand how to multiply fractions and mixed numbers to solve real-world problems.

Answer choices B, C, and D are plausible but incorrect. They represent common student errors made when solving real-world problems involving multiplication of fractions and mixed numbers.

What number goes in the blank to make the statement below true?

3,840 ounces = _____ pounds

A   24

B   240

C   480

D   61,440

Key: B
Measured CCLS: 5.MD.1

Commentary: The question measures 5.MD.1 because it asks the student to convert among different-sized standard measurement units within a given measurement system, specifically from ounces to pounds.

Extended Rationale

Answer Choice A: "24"; This response may reflect an incomplete understanding of conversion from ounces to pounds. A student who selects this response may have used the correct conversion relationship but mistakenly divided 384, instead of 3,840, by 16 to obtain a result of 24 pounds.

Answer Choice B: "240"; This response represents a correct conversion from ounces to pounds. Using the relationship "1 pound = 16 ounces," the student may have divided 3,840 ounces by 16 obtains a result of 240 pounds. A student who selects this response understands how to correctly convert among different-sized standard measurement units.

Answer Choice C: "480"; This response may reflect an incomplete understanding of conversion from ounces to pounds. A student who selects this response may have used the correct conversion process but mistakenly assumed that the conversion relationship was "1 pound = 8 ounces" and divided 3,840 by 8 to obtain a result of 480 pounds.

Answer Choice D: "61,440"; This response may reflect an incomplete understanding of how to convert between different-sized standard measurements. To arrive at this response, the student may have used the relationship "1 pound = 16 ounces" but multiplied 3,840, the number given in the stem, by the number 16 from the conversion relationship to obtain a result of 61,440 pounds.

Answer choices A, C, and D are plausible but incorrect. They are based on errors made when converting among different-sized standard measurement units within a given measurement system.

What is the area, in square inches, of a rectangle with the dimensions shown in the diagram below?

$\frac{7}{8}$ in.

$\frac{3}{16}$ in.
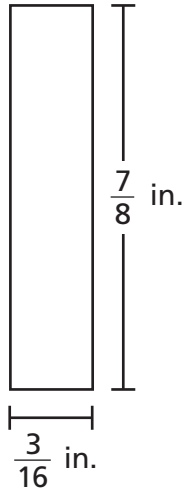
A $\frac{21}{128}$

B $\frac{3}{14}$

C $\frac{10}{24}$

D $\frac{24}{112}$

Key: A
Measured CCLS: 5.NF.4.b

Commentary: This question measures 5.NF.4.b by asking the student to multiply fractional side lengths to find the area of a rectangle.

Extended Rationale

Answer Choice A: "$\frac{21}{128}$"; This is the correct area of the rectangle shown. The student may have understood that multiplying the numerators of the two fractions and the denominators of the two fractions would result in the product of the two fractions. The student who selects this response understands how to multiply fractional side lengths to find the area of a rectangle.

Answer Choice B: "$\frac{3}{14}$"; This response may reflect a lack of understanding of finding the area of a rectangle with fractional side lengths. The student may have divided the width of the rectangle by the length, $\frac{3}{16} \div \frac{7}{8} = \frac{3}{14}$. The student who selects this response may not understand how to find the area of a rectangle with fractional side lengths.

10

Answer Choice C: "$\frac{10}{24}$"; This response may reflect a lack of understanding of finding the area of a rectangle. The student may have added the side lengths instead of multiplying the side lengths and added the fractions incorrectly, $\frac{3+7}{16+8} = \frac{10}{24}$. The student who selects this response may not understand how to multiply fractional side lengths to find the area of a rectangle.

Answer Choice D: "$\frac{24}{112}$"; This response may reflect a lack of understanding of multiplying fractions. The student may have multiplied the numerator of each fraction by the denominator of the other fraction, $\frac{3}{16} \times \frac{7}{8} = \frac{3 \times 8}{16 \times 7} = \frac{24}{112}$. The student who selects this response may not understand how to multiply fractions.

Answer choices B, C, and D are plausible but incorrect. They represent common student errors made when multiplying fractional side lengths to find the area of a rectangle.

What is the value of the expression below?

$$1,536 \div 24$$

A   57

B   64

C   65

D   68

Key: B
Measured CCLS: 5.NBT.6

Commentary: The question measures 5.NBT.6 because it asks the student to find the whole-number quotient of a four-digit dividend and a two-digit divisor.

Extended Rationale

Answer Choice A: "57"; This response is incorrect and may occur when a student mistakenly uses 1,356 as the dividend to obtain a result of 56.5 and then rounds to 57. A student who selects this response may have a limited understanding of how to find the whole number quotient of a four-digit dividend and a two-digit divisor.

Answer Choice B: "64"; This response represents the correct value of the expression. The student may have correctly performed the traditional algorithm for division with precision. Alternatively, the student may have used estimation to rule out options A and D and then used an understanding of the relationship between multiplication and division to determine whether 64 or 65 was the quotient.

Answer Choice C: "65"; This response is incorrect and may occur when a student correctly starts the calculation by determining that 24 divides into 153 six times, but incorrectly obtains 11 as the result of 153 – 144, leading to an answer of 65 after rounding. A student who selects this response may have a limited understanding of how to find the whole number quotient of a four-digit dividend and a two-digit divisor.

Answer Choice D: "68"; This response is incorrect and may occur when a student correctly starts the calculation by determining that 24 divides into 153 six times, but incorrectly obtains 19 as the result of 153 – 144, leading to an answer of 68 after rounding. A student who selects this response may have a limited understanding of how to find the whole number quotient of a four-digit dividend and a two-digit divisor.

Answer options A, C, and D are plausible but incorrect. They are based on errors made when a student is determining the quotient of a four-digit dividend and a two-digit divisor.

What is the volume, in cubic centimeters, of the figure below?
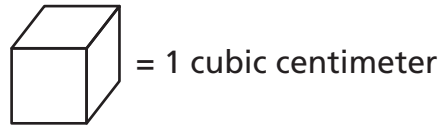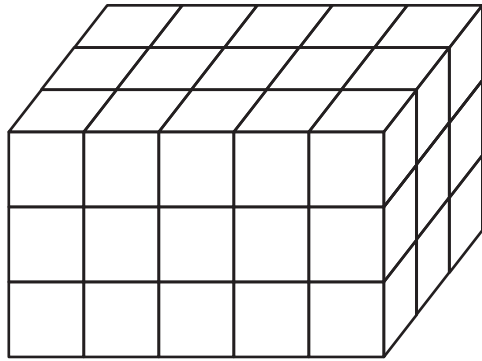
= 1 cubic centimeter

A 15

B 24

C 30

D 45

Key: D
Measured CCLS: 5.MD.4

Commentary: The question measures 5.MD.4 because it asks the student to measure the volume of a figure by counting unit cubes, using cubic centimeters.

Extended Rationale

Answer Choice A: "15"; This response may reflect an incorrect approach to finding the volume of the figure. A student who selects this response may have made a conceptual error in calculating the volume by finding the volume of the front layer (or top layer) only by multiplying 3 times 5.

$3 \times 5 = 15$

Answer Choice B: "24"; This response may reflect an incorrect approach to finding the volume of the figure. A student who selects this response may have made a conceptual error in calculating the volume by adding the volume of the front layer (or top layer), which is 15 cubic centimeters, and the layer on the right side, which is 9 cubic centimeters.

$15 + 9 = 24$

Answer Choice C: "30"; This response may reflect an incorrect approach to finding the volume of the figure. A student who selects this response may have made a conceptual error in calculating the volume by adding the volume of the front layer, which is 15 cubic centimeters, and the top layer, which is also 15 cubic centimeters.

$15 + 15 = 30$

Answer Choice D: "45"; This response represents the correct volume of the figure. The student may have counted the number of unit cubes in one layer of the rectangular prism and then used addition or multiplication to determine the total number of unit cubes as the volume, in cubic centimeters, of the figure. Alternatively, the student may have applied the formula for volume of a rectangular prism, using the length, width, and height values determined by counting the number of unit cubes along each dimension of the figure.

$5 \times 3 \times 3 = 45$

A student who selects this response understands how to measure the volume of a figure by counting unit cubes.

Answer choices A, B, and C are plausible but incorrect. They represent common student errors made when determining the volume of a figure in terms of unit cubes.

Millie designed a rectangular label to put on the front of her scrapbook. The label was $\frac{5}{12}$ foot wide and $\frac{5}{6}$ foot long. What was the area, in square feet, of the label?

A $2\frac{6}{12}$

B $1\frac{3}{12}$

C $\frac{10}{18}$

D $\frac{25}{72}$

Key: D
Measured CCLS: 5.NF.4.b

Commentary: This question measures 5.NF.4.b by asking the student to multiply fractional side lengths to find the area of a rectangle.

Extended Rationale

Answer Choice A: "$2\frac{6}{12}$"; This response may reflect an error in choosing the correct formula to use. The student may have found the perimeter of the rectangle, $\frac{5}{12} + \frac{5}{12} + \frac{5}{6} + \frac{5}{6} = 2\frac{6}{12}$, The student who selects this response may not understand how to distinguish between area and perimeter.

Answer Choice B: "$1\frac{3}{12}$"; This response may reflect a lack of understanding of finding the area of a rectangle with fractional side lengths. The student may have added the side lengths instead of multiplying the side lengths, $\frac{5}{12} + \frac{10}{12} = \frac{15}{12} = 1\frac{3}{12}$. The student who selects this response may not understand that multiplying the side lengths of the rectangle will result in the area.

Answer Choice C: "$\frac{10}{18}$"; This response may reflect a lack of understanding of finding the area of a rectangle with fractional side lengths. The student may have added the side lengths instead of multiplying the side lengths and added the fractions incorrectly, $\frac{5+5}{6+12} = \frac{10}{18}$. The student who selects this response may not understand how to multiply side lengths to determine the area of a rectangle or how to add fractions.

Answer Choice D: "$\frac{25}{72}$"; This is the correct area of the rectangle described. The student may have understood that multiplying the numerators of the two fractions and the denominators of the two fractions would result in the product of the two fractions. The student who selects this response understands how to multiply fractional side lengths to find the area of a rectangle.

Answer choices A, B, and C are plausible but incorrect. They represent common student errors made when multiplying fractional side lengths to find the area of a rectangle.

Which expression means the same as the phrase below?

Subtract 3 from the product of 8 and 5

A $(5 \times 8) + 3$

B $(5 \times 8) - 3$

C $5 \times (8 - 3)$

D $5 \times (8 + 3)$

Key: B
Measured CCLS: 5.OA.2

Commentary: The question measures 5.OA.2 because it asks the student to write a simple expression that records calculations with numbers. In this case the student must identify the expression that records the calculation, "subtract 3 from the product of 8 and 5."

Extended Rationale

Answer Choice A: "$(5 \times 8) + 3$"; This response may reflect a misunderstanding of the calculation described by the given phrase. A student who selects this response may have recognized that the product of 8 and 5 must be found first but then mistakenly added 3 instead of subtracting 3 from the product.

Answer Choice B: "$(5 \times 8) - 3$"; This response correctly represents the given phrase as a numerical expression. The given phrase describes a calculation in which the product of 8 and 5 is found first and 3 is then subtracted from the product. A student who selects this response understands how to write a simple expression that records calculations with numbers.

Answer Choice C: "$5 \times (8 - 3)$"; This response may reflect a misunderstanding of the calculation described by the given phrase. A student who selects this response may have understood that the values in the given phrase should be included in the numerical expression but did not understand which operations should be included and in which order.

Answer Choice D: "$5 \times (8 + 3)$"; This response may reflect a misunderstanding of the calculation described by the given phrase. A student who selects this response may have understood that the values in the given phrase should be included in the numerical expression but did not understand which operations should be included and in which order.

Answer choices A, C, and D are plausible but incorrect. They represent common student misunderstandings and errors made when writing a simple expression that records calculations with numbers.

Jim gave the following description of a figure:

- It is a quadrilateral.
- All sides are equal in length.
- There are two equal obtuse angles and two equal acute angles.

Which figure **could** match Jim's description?

A rectangle

B rhombus

C square

D pentagon

Key: B
Measured CCLS: 5.G.4

Commentary: This question measures 5.G.4 by asking the student to classify two-dimensional figures based on properties.

Extended Rationale

Answer Choice A: "rectangle"; This response may reflect an error in classifying a rectangle. The student may have found that the first two properties could describe a rectangle but did not understand that the third property does not describe the angles of a rectangle because all rectangles have four right angles. The student who selects this response may not understand the properties of a rectangle.

Answer Choice B: "rhombus"; This is the correct figure that could match Jim's description. The student may have known that a rhombus is a quadrilateral with sides of equal length and could have two equal obtuse and two acute equal angles. The student who selects this response understands how to classify two-dimensional figures in a hierarchy based on properties.

Answer Choice C: "square"; This response may reflect an error in classifying a square. The student may have found that the first two properties described were properties of a square but did not understand that the third property does not describe the angles of a square. A square has four right angles. The student who selects this response may not understand the properties of a square.

Answer Choice D: "pentagon"; This response may reflect an error in classifying a pentagon. The student may not have understood that a pentagon is not a quadrilateral, becuase it has five sides. The student who selects this response may not understand the properties of a pentagon.

Answer choices A, C, and D are plausible but incorrect. They represent common student errors made when classifying two-dimensional figures in a hierarchy based on properties.

Which expression is equivalent to 100,000?

A 10^4

B 10^5

C 10^6

D 10^7

Key: B
Measured CCLS: 5.NBT.2

Commentary: This question measures 5.NBT.2 by asking the student to use whole-number exponents to denote powers of 10.

Extended Rationale

Answer Choice A: "10^4"; This response may reflect an incomplete understanding of exponents. The student may have thought that 10 multiplied by itself 4 times could be computed by adding four zeroes to the number 10, resulting in 100,000. The student who selects this response may not understand how to use whole-number exponents to denote powers of 10.

Answer Choice B: "10^5"; This is the correct expression that is equivalent to 100,000. The student may have understood that the exponent on 10 denotes the number of times 10 is multiplied by itself. The student who selects this response understands how to use whole-number exponents to denote powers of 10.

Answer Choice C: "10^6"; This response may reflect an incomplete understanding of exponents. The student may have thought that 10 multiplied by itself 6 times would result in a six-digit number, 100,000. The student who selects this response may not understand how to use whole-number exponents to denote powers of 10.

Answer Choice D: "10^7"; This response may reflect an incomplete understanding of exponents. The student may have thought that 10 multiplied by itself 7 times would result in 100,000. The student who selects this response may not understand how to use whole-number exponents to denote powers of 10.

Answer choices A, C, and D are plausible but incorrect. They represent common student errors made when using whole-number exponents to denote powers of 10.

Lincoln had 2 books in his backpack. One book had a mass of 3 pounds 7 ounces, and the other book had a mass of 2 pounds 10 ounces. What was the total mass, in ounces, of the books?

A   60

B   77

C   80

D   97

Key: D
Measured CCLS: 5.MD.1

Commentary: This question measures 5.MD.1 by asking the student to convert among pounds and ounces, and use these conversions to solve a multi-step, real-world problem.

Extended Rationale

Answer Choice A: "60"; This response may reflect an incomplete understanding of converting pounds to ounces to solve a real-world problem. The student may have only converted the pound amounts (3 pounds and 2 pounds) to ounces, did not include the extra ounces (7 ounces and 10 ounces), and incorrectly converted 1 pound to 12 ounces, $(3 \times 12) + (2 \times 12) = 60$. The student who selects this response may not understand how to include the extra ounces in the calculation and how to convert pounds to ounces.

Answer Choice B: "77"; This response may reflect an error in converting pounds to ounces. The student may have understood how to determine the answer to the problem but incorrectly converted 1 pound to 12 ounces and calculated $3 \times 12 = 36$, $36 + 7 = 43$ and $2 \times 12 = 24$, $24 + 10 = 34$, so when the masses were added, the result was 77. The student who selects this response may not understand how to convert pounds to ounces

Answer Choice C: ""80"; This response may reflect an incomplete understanding of converting units to solve a real-world problem. The student may have only converted the pound amounts (3 pounds and 2 pounds) to ounces and did not include the extra ounces (7 ounces and 10 ounces), $(3 \times 16) + (2 \times 16) = 80$. The student who selects this response may not understand how to include the extra ounces in the calculation.

Answer Choice D: "97"; This is the correct response when the masses of both books are added. The student may have understood that there are 16 ounces in a pound, converted 3 pounds 7 ounces and 2 pounds 10 ounces to ounces, $3 \times 16 = 48$, $48 + 7 = 55$ and $2 \times 16 = 32$, $32 + 10 = 42$, and then added the two masses, $55 + 42 = 97$. The student who selects this response understands how to convert among pounds and ounces and use these conversions to solve a multi-step, real-world problem.

Answer choices A, B, and C are plausible but incorrect. They represent common student errors made when converting among pounds and ounces and using these conversions to solve a multi-step, real-world problem.

A box contains 512 grams of cereal. One serving of cereal is 56 grams. How many servings of cereal does the box contain?

A $9\frac{1}{4}$

B $9\frac{1}{8}$

C $9\frac{8}{56}$

D $9\frac{8}{512}$

Key: C
Measured CCLS: 5.NF.3

Commentary: The question measures 5.NF.3 because it asks the student to solve a word problem involving division of whole numbers leading to an answer in the form of fractions or mixed numbers. Specifically, the word problem involves dividing 512 by 56, which results in a mixed number.

Extended Rationale

Answer Choice A: "$9\frac{1}{4}$"; This response may reflect a partial understanding of how to perform the division calculation required by the problem. The student may have recognized that 56 divides into 512 nine times, but then made an error in determining and representing the correct value of the remainder.

Answer Choice B: "$9\frac{1}{8}$"; This response may reflect a partial understanding of how to perform the division calculation required by the problem. The student may have recognized that 56 divides into 512 nine times but then made an error in determining and representing the correct value of the remainder.

Answer Choice C: "$9\frac{8}{56}$"; This response represents the correct solution to the given problem. The student who selects this response likely performed the division required in the problem by correctly determining that 56 divides into 512 nine times, with a remainder of 8, and that this result can be written, in mixed number form, as $9\frac{8}{56}$. The student understands how to solve a word problem involving division of whole numbers leading to an answer in the form of fractions or mixed numbers.

Answer Choice D: "$9\frac{8}{512}$"; This response may reflect a partial understanding of how to perform the division calculation required by the problem The student may have recognized that 56 divides into 512 nine times, but then made an error in interpreting the remainder by using the dividend (512) instead of the divisor (56) as the denominator in the fractional part of the mixed number result.

Answer choices A, B, and D are plausible but incorrect. They represent common student errors made when solving a word problem involving division of whole numbers leading to an answer in the form of fractions or mixed numbers.

Lori and Maria bought juice to make fruit punch. Maria bought 5 bottles of juice, each containing 750 milliliters. Lori bought 4 liters of juice. Based on this information, which sentence is true?

A Lori bought 0.25 liter more juice than Maria.

B Maria bought 0.75 liter more juice than Lori.

C Maria bought 33.5 liters more juice than Lori.

D Lori bought 36.25 liters more juice than Maria.

Key: A
Measured CCLS: 5.MD.1

Commentary: This question measures 5.MD.1 by asking the student to convert among liters and milliliters and use these conversions to solve a multi-step, real-world problem.

Extended Rationale

Answer Choice A: "Lori bought 0.25 liter more juice than Maria." This is the correct response. The student may have multiplied 750 milliliters by 5 to get 3,750 milliliters for Maria and converted those milliliters to 3.75 liters because there are 1,000 milliliters in a liter. The student may then have subtracted 3.75 from 4 to get 0.25. The student who selects this response understands how to convert among liters and milliliters and use these conversions to solve a multi-step, real-world problem.

Answer Choice B: "Maria bought 0.75 liter more juice than Lori." This response may reflect a lack of understanding of converting milliliters to liters. The student may have incorrectly converted Lori's amount using 750 milliliters per liter, leading to 3750 – 3000 = 750, and then correctly converted 750 milliliters to liters. The student who selects this response may not fully understand how to convert among liters and milliliters.

Answer Choice C: "Maria bought 33.5 liters more juice than Lori." This response may reflect a lack of understanding of converting milliliters to liters. The student may have converted Maria's amount to 37.5 liters thinking that there are 100 milliliters in a liter, leading to 37.5 – 4 = 33.5. The student who selects this response may not understand how convert among liters and milliliters.

Answer Choice D: "Lori bought 36.25 liters more juice than Maria." This response may reflect a lack of understanding of converting milliliters to liters. The student may have converted Lori's amount to 40,000 milliliters, thinking that there are 10,000 milliliters per liter. This leads to 40,000 – 3,750 = 36,250, which would be 36.25 liters using the same incorrect conversion. The student who selects this response may not understand how to convert among liters and milliliters.

Answer choices B, C, and D are plausible but incorrect. They represent common student errors made when converting among liters and milliliters and using these conversions to solve a multi-step, real-world problem.

Which decimal best represents the location of point X on the number line below?
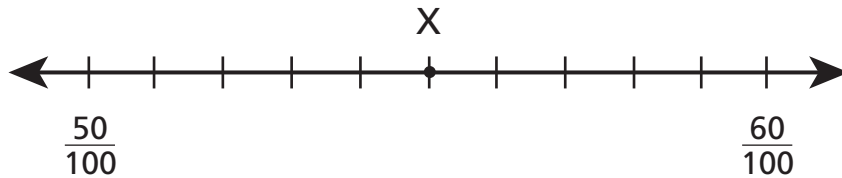
A 0.5

B 0.55

C 0.56

D 0.6

Key: B
Measured CCLS: 4.NF.6

Commentary: This question measures 4.NF.6 by asking the student to use decimal notation for fractions with denominators of 100 on a number line. Standard 4.NF.6 is designated as May-to-June in Grade 4. As indicated in the test guide, test questions may assess standards from previous grades.

Extended Rationale

Answer Choice A: "0.5"; This response may reflect an incomplete understanding of determining the decimal notation for a fraction. The student may have recognized that the point was plotted half the distance between $\frac{50}{100}$ and $\frac{60}{100}$ and assumed it could be represented as $\frac{1}{2}$ or 0.5. The student who selects this response may not understand how to use decimal notation for fractions with denominators of 100 on a number line.

Answer Choice B: "0.55"; This is the correct decimal that names the location of point X. The student may have understood that each interval on the number line is equal to 1 hundredth and then counted the intervals from 50 to 55 hundredths. The student who selects this response understands how to use decimal notation for fractions with denominators of 100 on a number line.

Answer Choice C: "0.56"; This response may reflect an incomplete understanding of how to count on a number line. The student may have started counting on the tick mark for $\frac{50}{100}$ instead of counting using the first tick mark to the right of $\frac{50}{100}$. The student who selects this response may not understand how to read or interpret values on a number line.

Answer Choice D: "0.6"; This response may reflect an incomplete understanding of how to interpret the tick marks on a number line. The student may have started counting by tenths from the first tick mark on the left and included the first tick mark in the count (0.1, 0.2, 0.3, 0.4, 0.5, 0.6). The student who selects this response may not understand how to use decimal notation for fractions with denominators of 100 on a number line.

Answer choices A, C, and D are plausible but incorrect. They represent common student errors made when using decimal notation for fractions with denominators of 100 on a number line.

Clark made a model of his house. His house is $30\frac{1}{2}$ feet long. The dimensions of the model were $\frac{1}{25}$ the dimensions of Clark's actual home. What is the length, in feet, of the model?

A $1\frac{10}{50}$

B $1\frac{11}{50}$

C $30\frac{23}{50}$

D $30\frac{27}{50}$

Key: B
Measured CCLS: 5.NF.6

Commentary: This question measures 5.NF.6 by asking the student to solve a real-world problem involving multiplication of fractions and mixed numbers.

Extended Rationale

Answer Choice A: "$1\frac{10}{50}$"; This response may reflect an error in converting the mixed number to a fraction and multiplying fractions. The student may have converted $30\frac{1}{2}$ to $\frac{60}{2}$ instead of $\frac{61}{2}$ and then calculated $\frac{60}{2} \times \frac{1}{25} = \frac{60}{50} = 1\frac{10}{50}$. The student who selects this response may not understand how to multiply mixed numbers and fractions.

Answer Choice B: "$1\frac{11}{50}$"; This is the correct length, in feet, of the model. The student may have understood that $30\frac{1}{2}$ could be converted to the fraction $\frac{61}{2}$ and calculated $\frac{61}{2} \times \frac{1}{25} = \frac{61}{50} = 1\frac{11}{50}$. The student who selects this response understands how to solve a real-world problem involving multiplication of fractions and mixed numbers.

Answer Choice C: "$30\frac{23}{50}$"; This response may reflect an error in interpreting the real-world problem situation. The student may have subtracted $\frac{1}{25}$ from $30\frac{1}{2}$ instead of multiplying the fractions. The student who selects this response may not understand how to interpret word problems.

Answer Choice D: "$30\frac{27}{50}$"; This response may reflect an error in interpreting the real-world problem situation. The student may have added $\frac{1}{25}$ to $30\frac{1}{2}$ instead of multiplying the fractions. The student who selects this response may not understand how to interpret word problems.

Answer choices A, C, and D are plausible but incorrect. They represent common student errors made when solving a real world problem involving multiplication of fractions and mixed numbers

Deb has a board that measures 5 feet in length. How many $\frac{1}{4}$-foot-long pieces can Deb cut from the board?

A 1

B 9

C 10

D 20

Key: D
Measured CCLS: 5.NF.7.c

Commentary: This question measures 5.NF.7.c by asking the student to solve real-world problems involving division of whole numbers by unit fractions.

Extended Rationale

Answer Choice A: "1"; This response may reflect an incomplete understanding of division of a whole number by a fraction. The student may have understood division by the fraction $\frac{1}{4}$ as a calculation involving $\frac{4}{1}$. However, the student subtracted instead of multiplying, $\frac{5}{1} - \frac{4}{1} = \frac{1}{1} = 1$. The student who selects this response may not understand how to divide a whole number by a unit fraction.

Answer Choice B: "9"; This response may reflect an incomplete understanding of division of a whole number by a fraction. The student may have understood division by the fraction $\frac{1}{4}$ as a calculation involving $\frac{4}{1}$, but added instead of multiplying, $\frac{5}{1} + \frac{4}{1} = \frac{9}{1} = 9$. The student who selects this response may not understand how to divide a whole number by a unit fraction.

Answer Choice C: "10"; This response may reflect an incomplete understanding of dividing a whole number by a fraction. The student may not have known how to set up the calculation so simply added all the numbers shown: 5 + 4 + 1 = 10. The student who selects this response may not understand how to divide a whole number by a fraction to solve a real-world problem.

Answer Choice D: "20"; This is the correct number of $\frac{1}{4}$-foot-long pieces that Deb can cut from the board. The student may have understood division by $\frac{1}{4}$ as multiplication by 4: $\frac{5}{1} \times \frac{4}{1} = \frac{20}{1} = 20$ or used other valid reasoning. The student who selects this response understands how to solve real-world problems involving division of a whole number by a unit fraction.

Answer choices A, B, and C are plausible but incorrect. They represent common student errors made when solving real-world problems involving division of a whole number by a unit fraction.

In which number does the 5 represent a value 10 times the value represented by the 5 in 35,187?

A 117,568

B 247,351

C 325,827

D 453,362

Key: D
Measured CCLS: 5.NBT.1

Commentary: This question measures 5.NBT.1 by asking the student to recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left.

Extended Rationale

Answer Choice A: "117,568"; This response may reflect an incomplete understanding of place value. The student may have thought a digit in one place represents 10 times as much as it represents in the place to its left and $\frac{1}{10}$ of what it represents in the place to its right. The student who selects this response may not understand that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left.

Answer Choice B: "247,351"; This response may reflect an error in understanding of place value. The student may have assumed that the digit in the tens place would always have a value 10 times greater than a digit in another place, so the student chose the number with the digit 5 in the tens place. The student who selects this response may not understand how to distinguish between place value and multiplying to find place value.

Answer Choice C: "325,827"; This response may reflect an error in determining place value in situations where one number has a greater number of digits than the other number. The student may have thought that the digit 5 in 325,827 was ten times more than the digit 5 in 35,187 because there is an extra digit in the number 325,827. The student who selects this response may not understand how to determine place value.

Answer Choice D: "453,362"; This is the correct response that shows a number with a digit 5 that represents a value, 50,000, that is ten times what the digit 5 represents in the number 35,187. The student who selects this response understands that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left.

Answer choices A, B, and C are plausible but incorrect. They represent common student errors made when understanding that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left.

Michele is 52 inches tall. Her father is 6 feet 3 inches tall. Exactly how many inches taller is Michele's father than Michele?

A 11

B 13

C 23

D 25

Key: C
Measured CCLS: 5.MD.1

Commentary: This question measures 5.MD.1 by asking the student to convert among feet and inches and use these conversions to solve a multi-step, real-world problem.

Extended Rationale

Answer Choice A: "11"; This response may reflect an incomplete understanding of converting feet to inches. The student may have thought that 6 feet 3 inches was equal to 63 inches, calculating 63 – 52 = 11. The student who selects this response may not understand how to convert among feet and inches to solve multi-step problems.

Answer Choice B: "13"; This response may reflect an incomplete understanding of converting among feet and inches. The student may have thought that 52 inches was equal to 5 feet 2 inches and calculated 6 ft 3 in. – 5 ft 2 in. = 1 ft 1 in. = 13 in. The student who selects this response may not understand how to convert among feet and inches.

Answer Choice C: "23"; This is the correct difference between 52 inches and 6 feet 3 inches. The student may have understood that there are 12 inches in 1 foot, so 6 feet 3 inches equals (6 × 12) + 3 = 75 feet and 75 – 52 = 23. The student who selects this response understands how to convert among feet and inches, and use these conversions to solve a multi-step, real-world problem.

Answer Choice D: "25"; This response may reflect an incomplete understanding of converting feet to inches. The student may have converted 52 inches to 4 feet 4 inches and then incorrectly subtracted feet from feet and inches from inches, 6 – 4 and 4 – 3 to get 2 feet 1 inch or 25 inches. The student who selects this response may not understand how to convert among feet and inches to solve multi-step problems.

Answer choices A, B, and D are plausible but incorrect. They represent common student errors made when converting among feet and inches to solve multi-step problems.

What is the value of $\frac{2}{5} + \frac{3}{7}$?

A $\frac{6}{35}$

B $\frac{5}{12}$

C $\frac{6}{12}$

D $\frac{29}{35}$

Key: D
Measured CCLS: 5.NF.1

Commentary: This question measures 5.NF.1 by asking the student to add fractions with unlike denominators.

Extended Rationale

Answer Choice A: "$\frac{6}{35}$"; This response may reflect an incomplete understanding of adding fractions. The student may have multiplied the numerators and multiplied the denominators to get $\frac{2}{5} \times \frac{3}{7} = \frac{6}{35}$. The student who selects this response may not understand the difference between adding fractions and multiplying fractions.

Answer Choice B: "$\frac{5}{12}$"; This response may reflect an incomplete understanding of adding fractions. The student may not have found common denominators and simply added the numerators and added the denominators to get $\frac{2}{5} + \frac{3}{7} = \frac{5}{12}$. The student who selects this response may not understand how to add fractions.

Answer Choice C: "$\frac{6}{12}$"; This response may reflect an incomplete understanding of adding fractions. The student may have multiplied the numerators and added the denominators to get $\frac{2}{5} + \frac{3}{7} = \frac{6}{12}$. The student who selects this response may not understand how to add fractions.

Answer Choice D: "$\frac{29}{35}$"; This is the correct result when $\frac{2}{5}$ and $\frac{3}{7}$ are added. The student may have understood how to find a common denominator of 35 to get $\frac{2}{5} = \frac{14}{35}$ and $\frac{3}{7} = \frac{15}{35}$ then added $\frac{14}{35} + \frac{15}{35} = \frac{29}{35}$. The student who selects this response understands how to add fractions with unlike denominators.

Answer choices A, B, and C are plausible but incorrect. They represent common student errors made when adding fractions.

A racecar driver completed three laps in the times shown below.

- 39.28 seconds
- 38.9 seconds
- 37.83 seconds

What was the total time, in seconds, it took for the driver to complete the three laps?

Show your work.

Answer _____ seconds

Measured CCLS: 5.NBT.7

Commentary: This question measures 5.NBT.7 because it assesses a student's ability to add decimals to hundredths.

Extended Rationale: This question asks the student to find the total time, in seconds, it took the racecar driver to complete three laps. Students must include a set of computations to explain and justify each step in their process. As indicated in the rubric, student responses will be rated on whether they show sufficient work to indicate a thorough understanding of adding decimals to hundredths. The determining factor in demonstrating a thorough understanding is using mathematically sound procedures to lead to a correct response.

The answer is 116.01 seconds and can be determined by adding the three numbers shown using the standard algorithm

```
    39.28
    38.9
+   37.83
   116.01
```

The student could also have added the whole numbers and fractional parts separately,

$39 + 38 + 37 = 114$

$0.28 + 0.9 + 0.83 = 2.01$

then combined these: $114 + 2.01 = 116.01$

A racecar driver completed three laps in the times shown below.

- 39.28 seconds
- 38.9 seconds
- 37.83 seconds

What was the total time, in seconds, it took for the driver to complete the three laps?

Show your work.

$$
\begin{array}{r}
1\ 1 \\
39.28 \\
+\ 38.90 \\
\hline
78.18 \\
+\ 37.83 \\
\hline
116.01
\end{array}
$$

Answer ___116.01___ seconds

Score Point 2 (out of 2 points)

This response includes the correct solution (116.01) and demonstrates a thorough understanding of the mathematical concepts in the task. The response shows the addition of the three times, and all calculations are accurate.

A racecar driver completed three laps in the times shown below.

- 39.28 seconds
- 38.9 seconds
- 37.83 seconds

What was the total time, in seconds, it took for the driver to complete the three laps?

Show your work.

$$
\begin{array}{r}
39.28 \\
38.9 \\
+\ 37.83 \\
\hline
116.01
\end{array}
$$

Answer _____ seconds

Score Point 2 (out of 2 points)

This response includes the correct solution and demonstrates a thorough understanding of the mathematical concepts in the task. The response shows the addition of the three times, and all calculations are accurate.

A racecar driver completed three laps in the times shown below.

- 39.28 seconds
- 38.9 seconds
- 37.83 seconds

What was the total time, in seconds, it took for the driver to complete the three laps?

Show your work.

$$
\begin{array}{r}
\overset{2}{3}\overset{2}{8}\overset{1}{} \\
39.28 \quad 2 \\
+\;38.9 \quad +1 \\
+\;37.83 \quad +2 \\
\hline
.11601
\end{array}
$$

(0.11601 seconds)

Answer 0.11601 seconds

A racecar driver completed three laps in the times shown below.

- 39.28 seconds
- 38.9 seconds
- 37.83 seconds

What was the total time, in seconds, it took for the driver to complete the three laps?

Show your work.

$$
\begin{array}{r}
\overset{1\ \ 1}{3}9.28 \\
+\ 38.9 \\
\hline
78.18
\end{array}
$$
Seconds in all.

Answer _78.18_ seconds

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The response contains an incorrect solution (78.18) but applies a mathematically appropriate process. The response shows the addition of two of the times, and the calculation is accurate.

A racecar driver completed three laps in the times shown below.

- 39.28 seconds
- 38.9 seconds
- 37.83 seconds

What was the total time, in seconds, it took for the driver to complete the three laps?

Show your work.

Answer __3.45__ seconds

Score Point 0 (out of 2 points)

This response is incorrect and does not demonstrate even a limited understanding of the mathematical concepts embodied in the task. The process used, subtracting the times from each other, is a mathematically inappropriate process.

A racecar driver completed three laps in the times shown below.

- 39.28 seconds
- 38.9 seconds
- 37.83 seconds

What was the total time, in seconds, it took for the driver to complete the three laps?

Show your work.

$$
\begin{array}{r}
39.28 \\
+\ 38.9 \\
\hline
6
\end{array}
$$

Answer __1.00__ seconds

Score Point 0 (out of 2 points)

This response is incorrect and does not demonstrate even a limited understanding of the mathematical concepts embodied in the task. The response indicates two times are to be added, but the operation is not completed.

Isabella is playing a game with the decimal numbers shown below.

1.5   1.05   0.15   0.105   1.50   0.015

She has to place each of the decimal numbers in one of the boxes shown below so that it makes a true number sentence. Each decimal number goes in only one box.

| A | < | B |

| C | > | D |

| E | = | F |

On the line above each decimal number, write the letter of the box where that number belongs.

| _____ | _____ | _____ | _____ | _____ | _____ |

| 1.5 | 1.05 | 0.15 | 0.105 | 1.50 | 0.015 |

Measured CCLS: 5.NBT.3.b

Commentary: This question measures 5.NBT.3.b because it assesses a student's ability to compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

Extended Rationale: This question asks the student to find the two decimals that will make each number sentence true. As indicated in the rubric, student responses will be rated on comparing two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

The student could have compared the decimals by using understanding of the values of each digit, by constructing and reasoning about a number line, by writing the numbers as fractions, or by other methods.

Possible correct answers are:

E, C, B, A, F, D or

F, B, C, D, E, A

or other valid combinations.

Isabella is playing a game with the decimal numbers shown below.

~~1.5~~ ~~1.05~~ ~~0.15~~ ~~0.105~~ ~~1.50~~ ~~0.015~~

She has to place each of the decimal numbers in one of the boxes shown below so that it makes a true number sentence. Each decimal number goes in only one box.

0.015 [A] < [B] 0.15

1.05 → [C] > [D] ← 0.105

1.5 → [E] = [F] ← 1.50

On the line above each decimal number, write the letter of the box where that number belongs.

E	C	B	D	F	A
1.5	1.05	0.15	0.105	1.50	0.015

Score Point 2 (out of 2 points)

This response includes the correct solution and demonstrates a thorough understanding of the mathematical concepts in the task. The response correctly identifies the letter corresponding to each decimal number to make three true number sentences.

Isabella is playing a game with the decimal numbers shown below.

1.5 1.05 0.15 0.105 1.50 0.015

She has to place each of the decimal numbers in one of the boxes shown below so that it makes a true number sentence. Each decimal number goes in only one box.

$$A < B$$

$$C > D$$

$$E = F$$

On the line above each decimal number, write the letter of the box where that number belongs.

E   C   D   B   F   A

| 1.5 | 1.05 | 0.15 | 0.105 | 1.50 | 0.015 |

Score Point 2 (out of 2 points)

This response includes the correct solution and demonstrates a thorough understanding of the mathematical concepts in the task. The response correctly identifies the letter corresponding to each decimal number to make three true number sentences.

Isabella is playing a game with the decimal numbers shown below.

1.5 1.05 0.15 0.105 1.50 0.015

She has to place each of the decimal numbers in one of the boxes shown below so that it makes a true number sentence. Each decimal number goes in only one box.

A < B

C > D

E = F

On the line above each decimal number, write the letter of the box where that number belongs.

E D B C F A

1.5 1.05 0.15 0.105 1.50 0.015

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The response correctly identifies the letters corresponding to four decimal numbers to make two true number sentences, E (1.5) = F (1.50) and A (0.015) < B (0.15).

Isabella is playing a game with the decimal numbers shown below.

1.5   1.05   0.15   0.105   1.50   0.015

She has to place each of the decimal numbers in one of the boxes shown below so that it makes a true number sentence. Each decimal number goes in only one box.

A   <   B

C   >   D

E   =   F

On the line above each decimal number, write the letter of the box where that number belongs.

B   E   B   A   F   G

1.5   1.05   0.15   0.105   1.50   0.015

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The response correctly identifies the letters corresponding to two decimal numbers to make one true number sentence, A (0.105) < B (0.15) or B (1.5). Although two different Bs are chosen, either one would make the number sentence true.

Isabella is playing a game with the decimal numbers shown below.

1.5 1.05 0.15 0.105 1.50 0.015

She has to place each of the decimal numbers in one of the boxes shown below so that it makes a true number sentence. Each decimal number goes in only one box.

| A | < | B |

| C | > | D |

| E | = | F |

On the line above each decimal number, write the letter of the box where that number belongs.

A B ⧧ C D F
1.5 1.05 0.15 0.105 1.50 0.015

Score Point 0 (out of 2 points)

This response is incorrect. None of the correspondences between letters and decimal numbers result in correct number sentences.

Isabella is playing a game with the decimal numbers shown below.

1.5 1.05 0.15 0.105 1.50 0.015

She has to place each of the decimal numbers in one of the boxes shown below so that it makes a true number sentence. Each decimal number goes in only one box.

A < B

C > D

E = F

On the line above each decimal number, write the letter of the box where that number belongs.

A	E	D	F	B	C
1.5	1.05	0.15	0.105	1.50	0.015

Score Point 0 (out of 2 points)

This response is incorrect. None of the correspondences between letters and decimal numbers result in correct number sentences.

Anna recorded the time she spent at soccer practice to the nearest $\frac{1}{4}$ hour for 15 days.

Her results are shown below.

TIME SPENT AT SOCCER PRACTICE (HOURS)

Monday	Tuesday	Wednesday	Thursday	Friday
$2\frac{1}{4}$	$2\frac{1}{2}$	$1\frac{3}{4}$	2	$1\frac{1}{2}$
$2\frac{3}{4}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{4}$
$1\frac{3}{4}$	$2\frac{1}{2}$	2	$1\frac{3}{4}$	$1\frac{3}{4}$

Make one line plot to display Anna's data over the 15-day period.

Be sure to

- title the line plot
- label the number line
- graph all the data

Measured CCLS: 5.MD.2

Commentary: This question measures 5.MD.2 because it assesses a student's ability to make a line plot to display a data set of measurements in fractions of a unit.

Extended Rationale: This question asks the student to make a line plot to display the data Anna recorded over a 15-day period for the number of hours she spent at soccer practice. As indicated in the rubric, student responses will be rated on whether they indicate a thorough understanding of making a line plot to display a data set of measurements in fractions of a unit. The determining factor in demonstrating a thorough understanding is using mathematically sound procedures to lead to a correct response.

The answer includes a title, a number line with tick marks starting at the left end of the line with the numbers 1, $1\frac{1}{2}$, $1\frac{3}{4}$, 2, $2\frac{1}{4}$, $2\frac{1}{2}$, $2\frac{3}{4}$, a labeled number line, and Xs at the following marks: $1\frac{1}{2}$ (1 X), $1\frac{3}{4}$ (5 Xs), 2(2 Xs), $2\frac{1}{4}$ (2 Xs), $2\frac{1}{2}$ (4 Xs), $2\frac{3}{4}$ (1 X).

Anna recorded the time she spent at soccer practice to the nearest $\frac{1}{4}$ hour for 15 days.

Her results are shown below.

TIME SPENT AT SOCCER PRACTICE (HOURS)

Monday	Tuesday	Wednesday	Thursday	Friday
$2\frac{1}{4}$	$2\frac{1}{2}$	$1\frac{3}{4}$	2	$1\frac{1}{2}$
$2\frac{3}{4}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{4}$
$1\frac{3}{4}$	$2\frac{1}{2}$	2	$1\frac{3}{4}$	$1\frac{3}{4}$

Make one line plot to display Anna's data over the 15-day period.

Be sure to

- title the line plot
- label the number line
- graph all the data

Hours spent at Soccer Practice

1   2   3

Hour

Anna recorded the time she spent at soccer practice to the nearest $\frac{1}{4}$ hour for 15 days.

Her results are shown below.

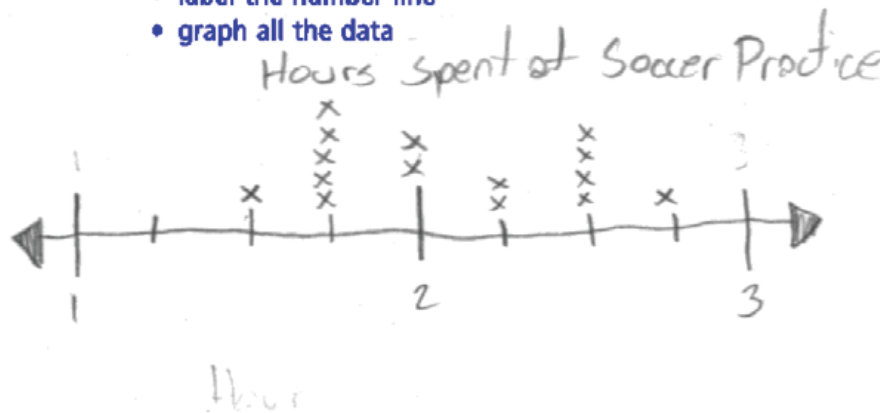## TIME SPENT AT SOCCER PRACTICE (HOURS)

Monday	Tuesday	Wednesday	Thursday	Friday
$2\frac{1}{4}$ 1	$2\frac{1}{2}$ 1	$1\frac{3}{4}$ 2	2 2	$1\frac{1}{2}$
$2\frac{3}{4}$ 1	$2\frac{1}{2}$ 2	$2\frac{1}{2}$ 4	$1\frac{3}{4}$ 3	$2\frac{1}{4}$ 2
$1\frac{3}{4}$	$2\frac{1}{2}$ 3	2 1	$1\frac{3}{4}$ 4	$1\frac{3}{4}$ 5

Make one line plot to display Anna's data over the 15-day period.

Be sure to

- title the line plot
- label the number line
- graph all the data

Time spent at soccer practice (hours)

1 1¼ 1½ 1¾ 2 2¼ 2½ 2¾ 3

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The response shows a correct title for the line plot, accurate labels for the number line (arrows are not necessary), and all of the data graphed correctly.

Anna recorded the time she spent at soccer practice to the nearest $\frac{1}{4}$ hour for 15 days.

Her results are shown below.

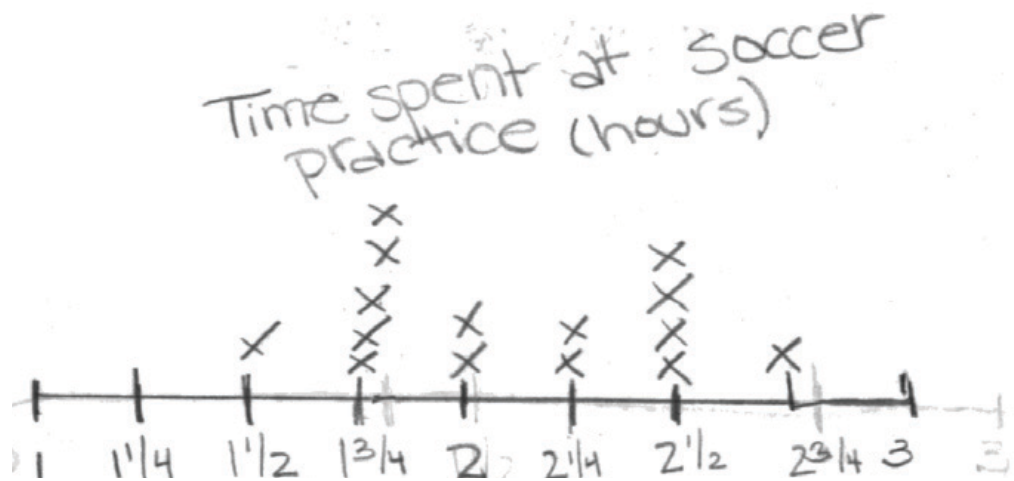## TIME SPENT AT SOCCER PRACTICE (HOURS)

Monday	Tuesday	Wednesday	Thursday	Friday
$2\frac{1}{4}$ X	$2\frac{1}{2}$ X	$1\frac{3}{4}$ X	2 X	$1\frac{1}{2}$ $\frac{3}{4}$ X
$2\frac{3}{4}$	$2\frac{1}{2}$ X	$2\frac{1}{2}$ X	$1\frac{3}{4}$ X	$2\frac{1}{4}$ X
$1\frac{3}{4}$ X	$2\frac{1}{2}$ X	2 X	$1\frac{3}{4}$ X	$1\frac{3}{4}$ X

Make one line plot to display Anna's data over the 15-day period.

Be sure to

- title the line plot
- label the number line
- graph all the data

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The response shows the data graphed correctly. However, a title for the line plot is omitted, and the labels for the line plot include an incorrect sequence ($2\frac{1}{4}$ should be to the left of $2\frac{1}{2}$).

Anna recorded the time she spent at soccer practice to the nearest $\frac{1}{4}$ hour for 15 days.

Her results are shown below.

TIME SPENT AT SOCCER PRACTICE (HOURS)

Monday	Tuesday	Wednesday	Thursday	Friday
$2\frac{1}{4}$	$2\frac{1}{2}$	$1\frac{3}{4}$	2	$1\frac{1}{2}$
$2\frac{3}{4}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{4}$
$1\frac{3}{4}$	$2\frac{1}{2}$	2	$1\frac{3}{4}$	$1\frac{3}{4}$

Make one line plot to display Anna's data over the 15-day period.

Be sure to

- title the line plot
- label the number line
- graph all the data

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The response shows accurate labels for the number line. However, the title is omitted, and some of the data is graphed incorrectly (missing one $1\frac{3}{4}$ and plots an extra $2\frac{3}{4}$).

Anna recorded the time she spent at soccer practice to the nearest $\frac{1}{4}$ hour for 15 days.
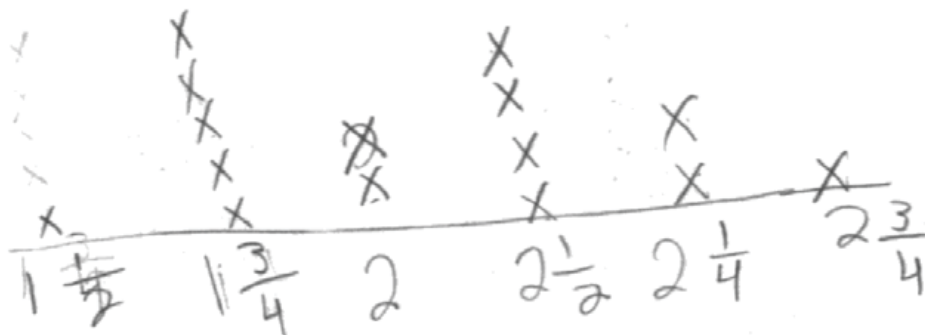
Her results are shown below.

TIME SPENT AT SOCCER PRACTICE (HOURS)

Monday	Tuesday	Wednesday	Thursday	Friday
$2\frac{1}{4}$	$2\frac{1}{2}$	$1\frac{3}{4}$	2	$1\frac{1}{2}$
$2\frac{3}{4}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{4}$
$1\frac{3}{4}$	$2\frac{1}{2}$	2	$1\frac{3}{4}$	$1\frac{3}{4}$

Make one line plot to display Anna's data over the 15-day period.

Be sure to

- title the line plot
- label the number line
- graph all the data

Time spent at soccer Practice (Hour

Key

X = 1 hour
/ = $\frac{1}{2}$ hour
\ = $\frac{3}{4}$ of an hour
. = $\frac{1}{4}$ of an hour

monday   tueday   wednesday   thursday   friday

Days of the week

$\frac{3}{4} + \frac{3}{4} = \frac{9}{4} = 2\frac{1}{4}$

Score Point 0 (out of 2 points)

This response is incorrect. The response shows a correct title; however, an incorrect title (Days of the week) is also shown. In addition, the line plot is labeled incorrectly, and the data is graphed inaccurately. Holistically, a correct title is not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task.

Anna recorded the time she spent at soccer practice to the nearest $\frac{1}{4}$ hour for 15 days.
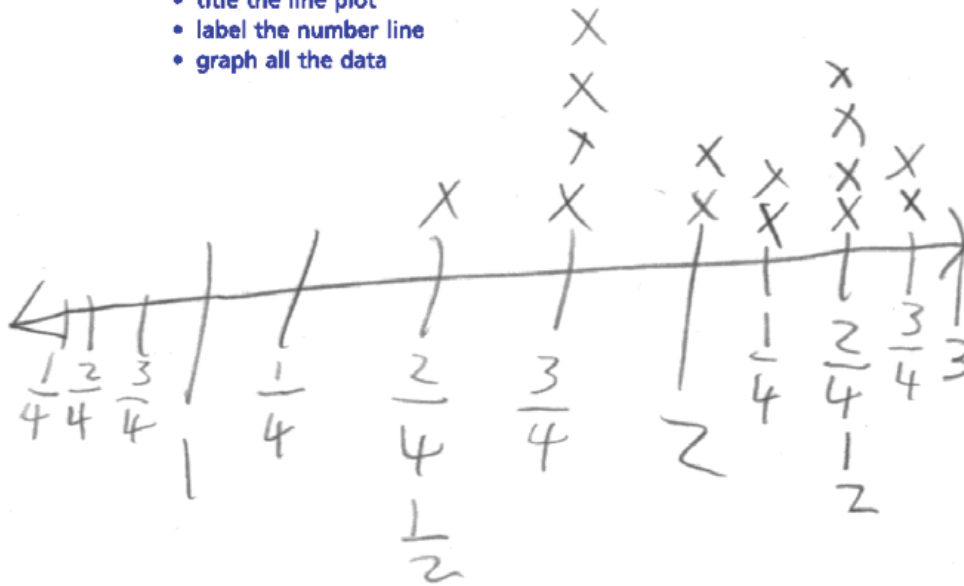
Her results are shown below.

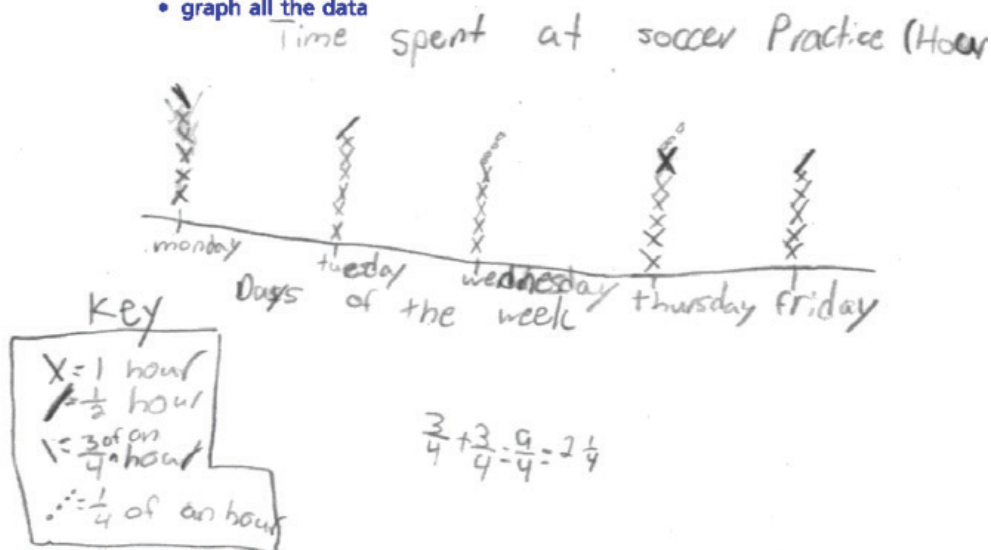### TIME SPENT AT SOCCER PRACTICE (HOURS)

Monday	Tuesday	Wednesday	Thursday	Friday
$2\frac{1}{4}$	$2\frac{1}{2}$	$1\frac{3}{4}$	2	$1\frac{1}{2}$
$2\frac{3}{4}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{4}$
$1\frac{3}{4}$	$2\frac{1}{2}$	2	$1\frac{3}{4}$	$1\frac{3}{4}$

Make one line plot to display Anna's data over the 15-day period.

Be sure to

- title the line plot
- label the number line
- graph all the data

Score Point 0 (out of 2 points)

This response is incorrect. The response shows a correct title; however, the data is graphed inappropriately. Holistically, a correct title with an inappropriate graph is not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task.

Each team in a youth basketball league pays $984 to join the league. If a team consists of 12 players and the fee is divided equally among the players, how much does each player pay?

Show your work.

Answer $_____

Measured CCLS: 5.NBT.6

Commentary: This question measures 5.NBT.6 because it assesses a student's ability to find a whole-number quotient of a whole number with a four-digit dividend and a two digit divisor.

Extended Rationale: This question asks the student to find the cost per player on a basketball team if the total cost to join the league is split equally among the players. The student must include a set of computations to explain and justify each step in their process. As indicated in the rubric, student responses will be rated on whether they show sufficient work to indicate a thorough understanding of finding a whole-number quotient of a whole number with a four-digit dividend and a two digit divisor. The determining factor in demonstrating a thorough understanding is using mathematically sound procedures to lead to a correct response.

The answer is $82 and can be determined by dividing the total amount of money, $984, by 12, the number of people on the team:

$984 \div 12 = 82$

Each team in a youth basketball league pays $984 to join the league. If a team consists of 12 players and the fee is divided equally among the players, how much does each player pay?

Show your work.

$$\begin{array}{r} 482 \\ 12\overline{)984} \\ -96\downarrow \\ \hline 024 \\ -24 \\ \hline 0 \end{array}$$

Answer $ $ 82

Score Point 2 (out of 2 points)

This response includes the correct solution ($82) and demonstrates a thorough understanding of the mathematical concepts in the task. The response correctly shows the total cost (984) divided by the number of players (12); all calculations are accurate (984 ÷ 12 = $82).

Each team in a youth basketball league pays $984 to join the league. If a team consists of 12 players and the fee is divided equally among the players, how much does each player pay?

Show your work.

$984 all together
12 players

12

12

82 ✓
x 12 (check work)
———
164
+ 82
———
$984

$82 each player pays

12) 984
   -960
   ———
    024
    -24
   ———
     00

Answer $ 82

Each team in a youth basketball league pays $984 to join the league. If a team consists of 12 players and the fee is divided equally among the players, how much does each player pay?

Show your work.

$$
\begin{array}{r}
92 \\
12\overline{)984} \\
-96 \\
\hline
24 \\
-24 \\
\hline
0
\end{array}
$$

Answer $ 92

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The response shows an appropriate procedure, the total cost divided by the number of players (984 ÷ 12); however, a calculation error in the division process (9 × 12 = 96 instead of 8 × 12 = 96) results in an incorrect solution (92).

Each team in a youth basketball league pays $984 to join the league. If a team consists of 12 players and the fee is divided equally among the players, how much does each player pay?

Show your work.

73 R8
12) 984
   94
   34 4
   36
     8. 6

12   12
× 4   × 8
4 8   1 06

12   12
× 6   × 0
7 2   94

12   12
× 3
36   ×

73
× 1 2
146
+ 730
876
+   8
88. 4

Answer $ 73r8

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The response shows the appropriate process, the total cost divided by the number of players (984 ÷ 12). However, a computational error (7 × 12 = 94) results in an incorrect solution (73r8).

Each team in a youth basketball league pays $984 to join the league. If a team consists of 12 players and the fee is divided equally among the players, how much does each player pay?

Show your work.

(handwritten work)

$$984 \times 12 = 11{,}808$$

Answer $ 11,808

Score Point 0 (out of 2 points)

This response is incorrect. The response correctly shows the total cost being divided by the number of players (984 ÷ 12); however, that work is crossed out. According to scoring policy #5, only the work that is not crossed out is scored. The work that is not crossed out shows an incorrect procedure (984 × 12 = 11,808) which results in an incorrect solution.

Each team in a youth basketball league pays $984 to join the league. If a team consists of 12 players and the fee is divided equally among the players, how much does each player pay?

Show your work.

$$
\begin{array}{r}
984 \\
+\ 12 \\
\hline
\$996
\end{array}
$$

Answer $ 996

Score Point 0 (out of 2 points)

This response is incorrect. The response shows an incorrect procedure (984 + 12 = $996) resulting in an incorrect solution. Although the addition is accurate, holistically it is not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task.

Prism X is shown below. The volume of Prism Y is 10 cubic centimeters greater than the volume of Prism X.

Prism X

KEY
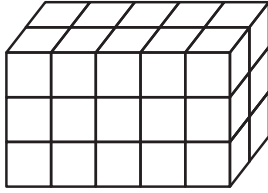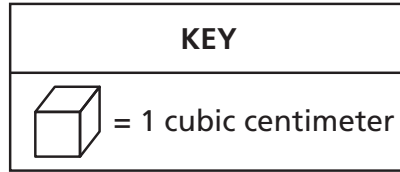
= 1 cubic centimeter

What is the volume of Prism Y?

Answer _____ cubic centimeters

What could be the length, width, and height of Prism Y?

Answer _____ centimeters by _____ centimeters by _____ centimeters

60

Measured CCLS: 5.MD.4

Commentary: This question measures 5.MD.4 because it assesses a student's ability to measure volume by counting unit cubes using cubic cm. The question also assesses 5.MD.5.b., because the student must apply the volume formula $V = l \times w \times h$ to solve a mathematical problem.

Extended Rationale: This question asks the student to find the volume of Prism Y given a model of Prism X in unit cubes. Then the student is asked to determine possible lengths for the length, width, and height of Prism Y. The determining factor in demonstrating a thorough understanding is using mathematically sound procedures to lead to a correct response.

The answers are 40 cubic cm and any valid set of numbers for length, width, and height, such as:

1, 1, 40
1, 2, 20
1, 4, 10
1, 5, 8
2, 2, 10
2, 4, 5
2, 2.5, 8

or other valid set of dimensions

The volume of Prism Y can be determined by counting the unit cubes for Prism X, which yields 30 unit cubes, and then adding 10 unit cubes to find a volume of 40 unit cubes for Prism Y.

The various possibilities for length, width, and height can be determined by applying the formula for volume of $l \times w \times h$ to determine a set that will lead to a volume of 40.

Prism X is shown below. The volume of Prism Y is 10 cubic centimeters greater than the volume of Prism X.

KEY
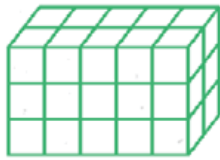
= 1 cubic centimeter
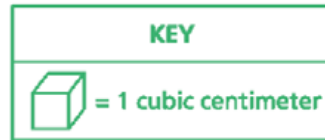
Prism X

What is the volume of Prism Y?

Answer _____40_____ cubic centimeters

What could be the length, width, and height of Prism Y?

Answer ___10___ centimeters by ___2___ centimeters by ___2___ centimeters

---

Score Point 2 (out of 2 points)

This response includes correct solutions for both parts and demonstrates a thorough understanding of the mathematical concepts in the task. The response shows 40 as the volume of prism Y and provides dimensions ($10 \times 2 \times 2$) that equal 40 cubic centimeters.

Prism X is shown below. The volume of Prism Y is 10 cubic centimeters greater than the volume of Prism X.

KEY
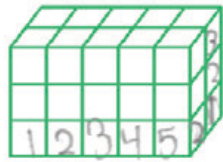
= 1 cubic centimeter
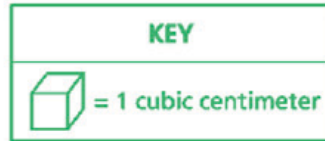
Prism X

What is the volume of Prism Y?

$(5 \times 2) \times 3$

$10 \times 3 = 30$

$\begin{array}{r} 30 \\ +10 \\ \hline 40 \end{array}$

Answer ___40___ cubic centimeters

What could be the length, width, and height of Prism Y?

$\boxed{1|2|3|4|5|6|7|8} \times \boxed{1} \times \boxed{\begin{array}{c}5\\4\\3\\2\\1\end{array}} = 40$ cubic centimeters

Length   Width   Height

Answer ___8___ centimeters by ___1___ centimeters by ___5___ centimeters

---

Score Point 2 (out of 2 points)

This response includes correct solutions for both parts and demonstrates a thorough understanding of the mathematical concepts in the task. The response shows 40 as the volume of prism Y and provides dimensions (8 × 1 × 5) that equal 40 cubic centimeters.

Prism X is shown below. The volume of Prism Y is 10 cubic centimeters greater than the volume of Prism X. 30

Prism X

KEY
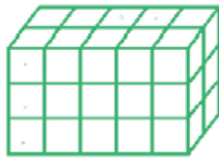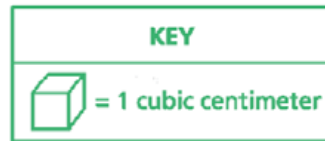
= 1 cubic centimeter

What is the volume of Prism Y?

X=30

Y=40

Answer __40__ cubic centimeters

What could be the length, width, and height of Prism Y?

Answer __15__ centimeters by __15__ centimeters by __10__ centimeters

---

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The response shows 40 as the volume of prism Y; however, the dimensions provided do not equal 40 cubic centimeters.

Prism X is shown below. The volume of Prism Y is 10 cubic centimeters greater than the volume of Prism X.

Prism X

KEY

= 1 cubic centimeter

What is the volume of Prism Y?

3
5

15
× 2
30

10
15
9 >14
____
34

15
× 2
30

Answer __30__ cubic centimeters

What could be the length, width, and height of Prism Y?

5
2

3 ×
× 5 >10
× 2
____
30

Answer __3__ centimeters by __5__ centimeters by __2__ centimeters

---

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The response shows an incorrect volume for prism Y (30); however, the dimensions (3 × 5 × 2) equal the volume provided in the first part.

Prism X is shown below. The volume of Prism Y is 10 cubic centimeters greater than the volume of Prism X.

Prism X

KEY
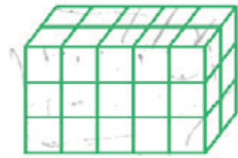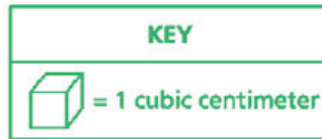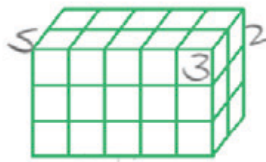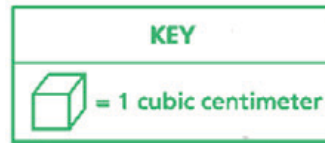
= 1 cubic centimeter

What is the volume of Prism Y?

$$\begin{array}{r} \times 5 \\ \times 3 \\ \hline 15 \\ \times 2 \\ \hline 30 \end{array}$$

Answer __30__ cubic centimeters

What could be the length, width, and height of Prism Y?

$$\begin{array}{r} 15 \\ \times 13 \\ \hline 35 \\ +150 \\ \hline 185 \end{array} \qquad \begin{array}{r} 185 \\ \times 20 \\ \hline 000 \\ +2900 \\ \hline 2900 \end{array}$$

Answer __15__ centimeters by __13__ centimeters by __20__ centimeters

---

Score Point 0 (out of 2 points)

This response is incorrect. The response shows an incorrect volume for prism Y (30) and dimensions that do not equal the correct volume or the volume provided in the first part.

66

Prism X is shown below. The volume of Prism Y is 10 cubic centimeters greater than the volume of Prism X.

KEY

= 1 cubic centimeter

Prism X

What is the volume of Prism Y?

Prism X

31 cubic centimeter

31
+16
41

Answer _41_ cubic centimeters

What could be the length, width, and height of Prism Y?
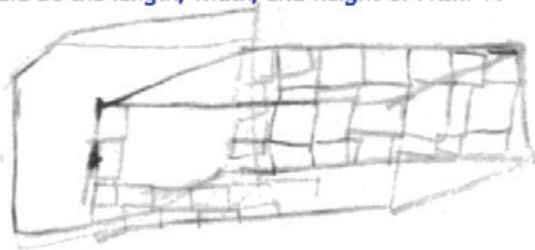
Answer _9_ centimeters by _9_ centimeters by _5_ centimeters

---

Score Point 0 (out of 2 points)

This response is incorrect. The response shows an incorrect volume for prism Y (41) and dimensions that do not equal the correct volume or the volume provided in the first part.

Brittany needs a total of $12\frac{3}{4}$ yards of yarn for an art project. She needs $1\frac{3}{8}$ yards of blue yarn and $5\frac{1}{2}$ yards of green yarn. The rest of the yarn she needs is red. How much red yarn does Brittany need?

Show your work.

Answer _____ yards

Measured CCLS: 5.NF.2

Commentary: This question measures 5.NF.2 because it assesses a student's ability solve a word problem involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators.

Extended Rationale: This question asks the student to find the amount of red yarn, in yards, Brittany needs for all three colors of the yarn she has to have a total length of $12\frac{3}{4}$ yards. Students must include a set of computations to explain and justify each step in their process. As indicated in the rubric, student responses will be rated on whether they show sufficient work to indicate a thorough understanding of solving a word problem involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators. The determining factor in demonstrating a thorough understanding is using mathematically sound procedures to lead to a correct response.

The answer is $5\frac{7}{8}$ yards and can be determined by adding the blue and green lengths of yarn, then subtracting this sum from the total length of $12\frac{3}{4}$ yards: $1\frac{3}{8} + 5\frac{1}{2} = 1\frac{3}{8} + 5\frac{4}{8} = 6\frac{7}{8}$.

$12\frac{3}{4} - 6\frac{7}{8} = 12\frac{6}{8} - 6\frac{7}{8}$

$12\frac{6}{8} - 6\frac{7}{8} = 5\frac{7}{8}$

This result could also be obtained using a visual model.

As an alternative, the student could also subtract the blue yarn length and then, subsequently, the green yard length from the total length of $12\frac{3}{4}$ yards:

$12\frac{3}{4} - 1\frac{3}{8} = 12\frac{6}{8} - 1\frac{3}{8} = 11\frac{3}{8}$

$11\frac{3}{8} - 5\frac{1}{2} = 11\frac{3}{8} - 5\frac{4}{8} = 5\frac{7}{8}$

Brittany needs a total of $12\frac{3}{4}$ yards of yarn for an art project. She needs $1\frac{3}{8}$ yards of blue yarn and $5\frac{1}{2}$ yards of green yarn. The rest of the yarn she needs is red. How much red yarn does Brittany need?

Show your work.

$$5\frac{1}{2} = \frac{11}{2} \times 4 \qquad 1\frac{3}{8} \quad \frac{11}{8}$$

$$\frac{44}{8} + \frac{11}{8} = \frac{55}{8}$$

$$12\frac{3}{4} \quad \frac{5}{4} \quad \frac{55}{8}$$

$$\frac{102}{8} - \frac{55}{8} = \quad 8\overline{)455} \qquad 6\frac{7}{8}$$
$$\qquad\qquad -48 \qquad 0\,\cancel{10}\,2$$
$$\frac{47}{8} = 8\overline{)47} \qquad -55$$
$$\qquad\qquad -40 \qquad 47$$
$$\qquad\qquad\quad 7$$

Answer $5\frac{7}{8}$ **yards**

Score Point 2 (out of 2 points)

This response includes the correct solution ($5\frac{7}{8}$) and demonstrates a thorough understanding of the mathematical concepts in the task. The response correctly shows the lengths of the green and blue yarn converted to eighths and added ($\frac{44}{8} + \frac{11}{8} = \frac{55}{8}$). The total amount of yarn is also converted to eighths. The sum is then subtracted from the total yarn needed for the project ($\frac{102}{8} - \frac{55}{8} = \frac{47}{8}$), and all calculations are accurate.

Brittany needs a total of $12\frac{3}{4}$ yards of yarn for an art project. She needs $1\frac{3}{8}$ yards of blue yarn and $5\frac{1}{2}$ yards of green yarn. The rest of the yarn she needs is red. How much red yarn does Brittany need?

Show your work.

$$5\frac{1\times4}{2\times4} = 5\frac{4}{8}$$

$$+1\frac{3\times1}{8\times1} = 1\frac{3}{8}$$

$$6\frac{7}{8}$$

$$12\frac{3\times2}{4\times2} = 12\frac{6}{8} = \frac{14}{8}$$

$$-6\frac{7\times1}{8\times1} = 6\frac{7}{8} \quad \frac{7}{8}$$

$$5\frac{7}{8}$$

Answer $5\frac{7}{8}$ yards

Score Point 2 (out of 2 points)

This response includes the correct solution and demonstrates a thorough understanding of the mathematical concepts in the task. The response correctly shows the lengths of yarn converted to equivalent mixed numbers with a common denominator of 8. The blue and green lengths are added together ($5\frac{4}{8} + 1\frac{3}{8} = 6\frac{7}{8}$). The sum is then subtracted from the total yarn needed for the project ($12\frac{6}{8} - 6\frac{7}{8} = 5\frac{7}{8}$), resulting in a correct solution.

Brittany needs a total of $12\frac{3}{4}$ yards of yarn for an art project. She needs $1\frac{3}{8}$ yards of blue yarn and $5\frac{1}{2}$ yards of green yarn. The rest of the yarn she needs is red. How much red yarn does Brittany need? $6\frac{1}{8}$ and y $\underline{\hspace{1cm}}$ $12\frac{6}{8}$

Show your work.

$5\frac{1}{2}\frac{\times 4 = 4}{\times 4 = 8}$

$1\frac{3}{8}$

$12\frac{3\times 2=6}{4\times 2=8}$

$\begin{array}{r} 5\frac{4}{8} \\ + 1\frac{3}{8} \\ \hline 6\frac{7}{8} \end{array}$

$\begin{array}{r} \overset{11}{\cancel{0}}\cancel{12}\frac{\overset{16}{\cancel{6}}}{8} \\ - 6\frac{7}{8} \\ \hline 5\frac{9}{8} \rightarrow 6\frac{1}{8} \end{array}$

Answer $6\frac{1}{8}$ yards

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The response contains an incorrect solution but demonstrates a mathematically appropriate process. The response correctly shows the lengths of yarn converted to an equivalent mixed number with a common denominator of 8. The green and blue lengths are correctly added ($5\frac{4}{8} + 1\frac{3}{8} = 6\frac{7}{8}$). The sum is then subtracted from the total yarn needed for the project ($12\frac{6}{8} - 6\frac{7}{8}$); however, an error in regrouping (11 and $\frac{16}{8}$, instead of 11 and $\frac{14}{8}$) leads to an incorrect solution.

Brittany needs a total of $12\frac{3}{4}$ yards of yarn for an art project. She needs $1\frac{3}{8}$ yards of blue yarn and $5\frac{1}{2}$ yards of green yarn. The rest of the yarn she needs is red. How much red yarn does Brittany need?

Show your work.

$$\frac{88}{22}$$
$$\overline{110}$$

$$\frac{11}{2} + \frac{11}{8} = \frac{22}{16} + \frac{88}{16} = \frac{110}{16} = 6\frac{14}{16_2} = 6\frac{7}{8} =$$

$$\begin{array}{r} \overset{3}{16} \\ \times\ 5 \\ \hline 80 \end{array}$$

$$\begin{array}{r} \overset{3}{16} \\ \times\ 6 \\ \hline 96 \end{array}$$

$$\begin{array}{r} \overset{4}{16} \\ 7 \\ \hline 112 \end{array}$$

$$\begin{array}{r} 110 \\ -\ 96 \\ \hline 014 \end{array}$$

$$\frac{16}{32}$$

$$\frac{14}{30}$$

$$2\overline{)14}$$

Answer $6\frac{7}{8}$ yards

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding, correctly addressing only some elements of the task. The response correctly shows the lengths of green and blue yarn converted to improper fractions with a common denominator and added ($^{11}/_2 + {}^{11}/_8 = {}^{22}/_{16} + {}^{88}/_{16} = \ldots = 6^7/_8$). The response does not, however, determine the amount of red yarn needed.

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Brittany needs a total of $12\frac{3}{4}$ yards of yarn for an art project. She needs $1\frac{3}{8}$ yards of blue yarn and $5\frac{1}{2}$ yards of green yarn. The rest of the yarn she needs is red. How much red yarn does Brittany need?

Show your work.

$$1\frac{3}{8} - 5\frac{1}{2} = 4\frac{2}{6}$$

Answer $4\frac{2}{6}$ yards

Score Point 0 (out of 2 points)

This response is incorrect. The response incorrectly shows the length of green yarn subtracted from the length of blue yarn.

Brittany needs a total of $12\frac{3}{4}$ yards of yarn for an art project. She needs $1\frac{3}{8}$ yards of blue yarn and $5\frac{1}{2}$ yards of green yarn. The rest of the yarn she needs is red. How much red yarn does Brittany need?

Show your work.

12 ³/₄

blue red green
13/8 ? 5 1/2
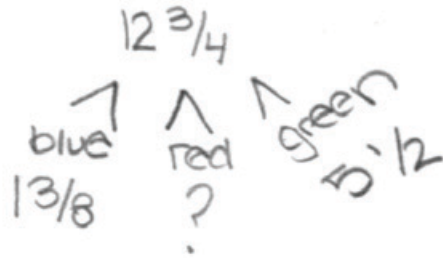
8)8,16,24,32
2)2,4,6,8

$\frac{1}{2} \times \frac{4}{4} = \frac{4}{8}$

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

Answer __4 1/8__ yards

Score Point 0 (out of 2 points)

Although this response contains some correct mathematical procedures ($5\frac{1}{2} = 5\frac{4}{8}$) and calculations ($5\frac{4}{8} - 1\frac{3}{8} = 4\frac{1}{8}$), holistically they are not sufficient to demonstrate even a limited understanding of the mathematical concepts. Subtracting the length of blue yarn from the length of green yarn is an irrelevant process.

An empty shipping box has a mass of 2.75 kilograms. An electronics store is packing 5 identical laptops in the shipping box. Each laptop has a mass of 1.65 kg.

The cost to ship the box was $40.00 for the first 5 kg and $3.15 for each kilogram over 5 kg. What was the cost to ship the packed box?

Show your work.

Answer $_____

Measured CCLS: 5.NBT.7

Commentary: This question measures 5.NBT.7 because it assesses a student's ability to add, subtract, and multiply decimals to hundredths using strategies based on place value. Students must apply these understandings in the context of a real-world problem.

Extended Rationale: This question asks the student to find the total cost to ship a 2.75 kilogram box full of 5 laptops that weigh 1.65 kilograms each given the costs to ship per kilogram. Students must include a set of computations to explain their process. As indicated in the rubric, student responses will be rated on whether they show sufficient work to indicate a thorough understanding of adding, subtracting, and multiplying decimals to hundredths using strategies based on place value. The determining factor in demonstrating a thorough understanding is using mathematically sound procedures to lead to a correct response.

The answer is $58.90 and can be determined by multiplying five times 1.65 and adding this to 2.75 kilograms to find the total mass of the package, which is 11 kilograms. The student could then subtract 5 pounds to determine that six kilograms of the package will cost $3.15 per kilogram, and then multiply six by $3.15. Finally, the student could add this product to the charge of $40 for the first 5 kilograms to determine the correct total of $58.90.

$5 \times 1.65 = 8.25$

$8.25 + 2.75 = 11$

$11 - 5 = 6$

$6 \times 3.15 = 18.90$

$40 + 18.90 = 58.90$

An empty shipping box has a mass of 2.75 kilograms. An electronics store is packing
5 identical laptops in the shipping box. Each laptop has a mass of 1.65 kg.

The cost to ship the box was $40.00 for the first 5 kg and $3.15 for each kilogram over
5 kg. What was the cost to ship the packed box?

Show your work.

Answer $ 58.90

Score Point 3 (out of 3 points)

This response includes the correct solution ($58.90) and demonstrates a thorough understanding
of the mathematical concepts and procedures in the task. The response shows correct procedures
for calculating the cost to ship the box of laptops: determines the total mass of the laptops
($1.65 \times 5 = 8.25$); adds that mass to the mass of the shipping box ($8.25 + 2.75 = 11.00$); calculates
the cost to ship the remaining 6 kg ($3.15 \times 6 = \$18.90$); and finally adds the cost to ship the first 5kg
($\$40.00 + \$18.90 = \$58.90$). Not showing the calculation of the mass over 5 kg, $11 - 5 = 6$, does not
detract from the demonstration of a thorough understanding.

An empty shipping box has a mass of 2.75 kilograms. An electronics store is packing 5 identical laptops in the shipping box. Each laptop has a mass of 1.65 kg.

The cost to ship the box was $40.00 for the first 5 kg and $3.15 for each kilogram over 5 kg. What was the cost to ship the packed box?

Show your work.

$$\begin{array}{r} \overset{3}{1}.\overset{2}{6}5 \\ \times \quad 5 \\ \hline 8.25 \end{array}$$

$$\begin{array}{r} 2.75 \\ + 8.25 \\ \hline 11.00 \end{array} \text{kilograms}$$

5 kg $40
extra
1 kg = $3.15

6 kg = $

$$\begin{array}{r} \overset{3}{3}.15 \\ \times \quad 6 \\ \hline 18.90 \end{array}$$

$$\begin{array}{r} 40.00 \\ + 18.90 \\ \hline 58.90 \end{array}$$

Answer $ 58.90

Score Point 3 (out of 3 points)

This response includes the correct solution ($58.90) and demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The response shows correct procedures for calculating the cost to ship the box of laptops, including determining the total mass of the laptops (1.65 × 5 = 8.25), adding that mass to the mass of the shipping box (8.25 + 2.75 = 11.00), calculating the cost to ship the remaining 6 kg (3.15 × 6 = 18.90), and finally adding the cost to ship the first 5kg (40.00 + 18.90 = 58.90). Not showing the calculation of the mass over 5 kg, 11 – 5 = 6, does not detract from the demonstration of a thorough understanding.

An empty shipping box has a mass of 2.75 kilograms. An electronics store is packing 5 identical laptops in the shipping box. Each laptop has a mass of 1.65 kg.

The cost to ship the box was $40.00 for the first 5 kg and $3.15 for each kilogram over 5 kg. What was the cost to ship the packed box?

Show your work.

empty shipping box
2.75 kilograms

5 identical laptops
each weighs 1.65 kg.

```
  3 2
  1.65
 x  5
 ─────
  8.25
+ 2.75
 ─────
 11.00 kg
```

```
 40.00
+ 3.15
 ─────
 43.15
```

```
   0
  1/1
 - 5
 ───
   6
 - 5
 ───
   1
```

Answer $ _____43.15_____

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The response appropriately addresses most aspects of the task using mathematically sound procedures. The response shows correct calculations to determine the total mass of the laptops (1.65 × 5 = 8.25) added to the mass of the shipping box (8.25 + 2.75 = 11.00). The response also determines the mass over 5 kg (11 – 5 = 6); however, only the cost to ship 1 additional kg is added to the cost for the first 5 kg (40.00 + 3.15 = 43.15) resulting in an incorrect solution.

An empty shipping box has a mass of 2.75 kilograms. An electronics store is packing 5 identical laptops in the shipping box. Each laptop has a mass of 1.65 kg.

The cost to ship the box was $40.00 for the first 5 kg and $3.15 for each kilogram over 5 kg. What was the cost to ship the packed box?

Show your work.

How much all 5 laptops way together.

$$3\overset{2}{1}.65$$
$$\times 1.65$$
$$5$$
$$\overline{8.25}$$

8.25
1.65
$\overline{9.90}$ How much the box ways with the 5 laptops in it.

9.90
− 5.00   How much it goes over 5 kg
$\overline{4.90}$ ←

$40.00
+ 12.60
$\overline{52.60}$

3.15
× 4
$\overline{12.60}$

Answer $ 52.60

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The response appropriately addresses most aspects of the task using mathematically sound procedures. The response shows the correct procedure for determining the total mass of the laptops $(1.65 \times 5 = 8.25)$; however, that product (8.25) is added to the mass of a laptop rather than the mass of the empty shipping box $(8.25 + 1.65 = 9.90)$. This sum is appropriately used to calculate the mass over 5 kg $(9.90 – 5.00 = 4.90)$. The difference is inappropriately truncated to 4 $(3.15 \times 4 = 12.60)$ to calculate the shipping cost for the mass over 5 kg. This calculated cost is correctly added to the cost to ship the first 5 kg $($40.00 + 12.60 = 52.60)$, resulting in an incorrect solution.

An empty shipping box has a mass of 2.75 kilograms. An electronics store is packing 5 identical laptops in the shipping box. Each laptop has a mass of 1.65 kg.

The cost to ship the box was $40.00 for the first 5 kg and $3.15 for each kilogram over 5 kg. What was the cost to ship the packed box?

Show your work.

$$
\begin{array}{r}
\overset{3}{}\overset{2}{1.65} \\
\times\ \ 5 \\
\hline
8.25 \\
+\ 2.75 \\
\hline
11.00
\end{array}
$$

over 5 Kg

Answer $ __$80 00__

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts and procedures in the task. The response shows correct procedures for calculating the total mass of the laptops (1.65 × 5 = 8.25) and adding that mass to the mass of the empty shipping box (8.25 + 2.75 = 11.00); however, the remaining procedures to determine the cost of shipping are omitted and the solution is incorrect.

An empty shipping box has a mass of 2.75 kilograms. An electronics store is packing 5 identical laptops in the shipping box. Each laptop has a mass of 1.65 kg.

The cost to ship the box was $40.00 for the first 5 kg and $3.15 for each kilogram over 5 kg. What was the cost to ship the packed box?

Show your work.

$$1.65 \times 5 = 8.25$$

$$2.75 + 1.65 = 4.40$$

$$8.25 - 5.00 = 3.25$$

$$2.75 + 8.25 = 11.00$$

$$40.00 + 12.60 = 52.60$$

$$3.15 \times 4 = 12.60$$

Answer $ ___$52.60___

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts and procedures in the task. The response shows correct procedures for calculating the total mass of the laptops ($1.65 \times 5 = 8.25$) and adding that mass to the mass of the empty shipping box ($8.25 + 2.75 = 11.00$). The response then shows the subtraction of 5 kg from 8.25 instead of 11 ($8.25 - 5.00 = 3.25$). The response also shows calculations for the mass of the shipping box and one laptop ($2.75 + 1.65 = 4.40$) and the cost to ship 4 additional kg ($3.15 \times 4 = 12.60$). That product is then added to the cost to ship the first 5 kg, resulting in an incorrect solution.

An empty shipping box has a mass of 2.75 kilograms. An electronics store is packing 5 identical laptops in the shipping box. Each laptop has a mass of 1.65 kg.

The cost to ship the box was $40.00 for the first 5 kg and $3.15 for each kilogram over 5 kg. What was the cost to ship the packed box?

Show your work.

$$
\begin{array}{r}
\overset{3}{\overset{2}{1}}.65 \\
\times\ .65 \\
\hline
8.25
\end{array}
$$

Answer $ 8.25

An empty shipping box has a mass of 2.75 kilograms. An electronics store is packing 5 identical laptops in the shipping box. Each laptop has a mass of 1.65 kg.

The cost to ship the box was $40.00 for the first 5 kg and $3.15 for each kilogram over 5 kg. What was the cost to ship the packed box?

Show your work.

$$
\begin{array}{r}
4\overset{1}{0}.\overset{1}{0}0 \\
2.75 \\
1.65 \\
+\ 3.15 \\
\hline
47.45
\end{array}
$$

Answer $ __47.45__

Score Point 0 (out of 3 points)

This response is incorrect. The response shows only the addition of numbers in the problem. The response does not demonstrate even a limited understanding of the mathematical concepts embodied in the task.

Last year, Bob's Market ordered $15\frac{1}{2}$ pounds of plums from a local orchard. This year, the market plans to order $1\frac{1}{4}$ times as many pounds of plums as were ordered last year. They want $\frac{2}{5}$ of this order to be red plums. What is the total amount, in pounds, of red plums the market plans to order this year? Write your answer as a mixed number.

Show your work.

Answer _____ pounds

Measured CCLS: 5.NF.6

Commentary: This question measures 5.NF.6 because it assesses a student's ability to solve real world problems involving multiplication of fractions and mixed numbers.

Extended Rationale: This question asks the student to find the total amount of red plums, in pounds, ordered by Bob's Market if the market orders $1\frac{1}{4}$ times more plums than last year, $15\frac{1}{2}$ pounds, and $\frac{2}{5}$ of the order is red plums. The student must include a set of computations to explain and justify each step in their process. As indicated in the rubric, student responses will be rated on whether they show sufficient work to indicate a thorough understanding of solving real world problems involving multiplication of fractions and mixed numbers. The determining factor in demonstrating a thorough understanding is using mathematically sound procedures to lead to a correct response.

The answer is $7\frac{3}{4}$ pounds and can be determined by first multiplying last year's total of $15\frac{1}{2}$ pounds by $1\frac{1}{4}$ and then multiplying this result by $\frac{2}{5}$:

$$15\frac{1}{2} \times 1\frac{1}{4} = \frac{31}{2} \times \frac{5}{4} = \frac{155}{8}$$

$$\frac{155}{8} \times \frac{2}{5} = \frac{310}{40} = 7\frac{3}{4}$$

Last year, Bob's Market ordered $15\frac{1}{2}$ pounds of plums from a local orchard. This year, the market plans to order $1\frac{1}{4}$ times as many pounds of plums as were ordered last year. They want $\frac{2}{5}$ of this order to be red plums. What is the total amount, in pounds, of red plums the market plans to order this year? Write your answer as a mixed number.

Show your work.

$15\frac{1}{2} \times 1\frac{1}{4}$

$\frac{31}{2} \times \frac{5}{4} = \frac{155}{8}$

$\frac{155}{8} \div 5$

$\frac{155}{8} \times \frac{1}{5} = \frac{31}{8} = 3\frac{7}{8} \times 2$

$\frac{31}{8} \times \frac{62}{8}$

$\frac{62}{8} = 7\frac{6}{8}$

$7\frac{3}{4}$

Answer ___$7\frac{3}{4}$___ pounds

Score Point 3 (out of 3 points)

This response includes the correct solution to the question and demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The response shows last year's order, $15\frac{1}{2}$ pounds, expressed as an improper fraction and multiplied by the planned increase ($^{31}/_2 \times {}^5/_4 = {}^{155}/_8$). To calculate what portion of the order will be red plums, the response shows the increased order amount divided by 5 and multiplied by 2. The solution is correctly shown as a mixed number.

Last year, Bob's Market ordered $15\frac{1}{2}$ pounds of plums from a local orchard. This year, the market plans to order $1\frac{1}{4}$ times as many pounds of plums as were ordered last year. They want $\frac{2}{5}$ of this order to be red plums. What is the total amount, in pounds, of red plums the market plans to order this year? Write your answer as a mixed number.

Show your work.

$$1\frac{1}{4} \times \frac{2}{5}$$

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

$$15\frac{1}{2} \times \frac{1}{2}$$

$$\frac{31}{2} \times \frac{1}{2} = \frac{31}{4}$$

$$\begin{array}{r} 7\frac{3}{4} \\ 4\overline{)31} \\ -28 \\ \hline 3 \end{array}$$

Answer _____ $7\frac{3}{4}$ _____ pounds

Score Point 3 (out of 3 points)

This response includes the correct solution to the question and demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The response contains the correct calculations to show what fraction of the increase will be red plums ($1\frac{1}{4} \times \frac{2}{5} = \frac{1}{2}$). Last year's order is then multiplied by $\frac{1}{2}$ to correctly calculate how much of the increased order will be red plums, and the solution is correctly shown as a mixed number ($7\frac{3}{4}$).

Last year, Bob's Market ordered $15\frac{1}{2}$ pounds of plums from a local orchard. This year, the market plans to order $1\frac{1}{4}$ times as many pounds of plums as were ordered last year. They want $\frac{2}{5}$ of this order to be red plums. What is the total amount, in pounds, of red plums the market plans to order this year? Write your answer as a mixed number.

Show your work.

$15\frac{1}{2}$

$15\frac{1}{2}$ X

$1\frac{1}{4}$

$\frac{2}{5}$

$\frac{31}{2} \times \frac{5}{4} = \frac{155}{8}$

$\begin{array}{r} 31 \\ \times 5 \\ \hline 155 \end{array}$

$\frac{155}{8} \times \frac{2}{5} = \frac{310}{40}$

$8\overline{)155} \\ 8\downarrow \\ 75 \\ 72 \\ 3$

19

$\begin{array}{r} 155 \\ \times 2 \\ \hline 310 \end{array}$

$\begin{array}{r} 2810 \\ - 280 \\ \hline 0\ 30 \end{array}$

$\begin{array}{r} 40 \\ \times\ 7 \\ \hline 280 \end{array}$

$\frac{310}{40}$

Answer _____310/40_____ pounds

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts and procedures in the task. The response shows last year's order, 15½ pounds, expressed as an improper fraction and multiplied by the planned increase ($^{31}/_2 \times {}^5/_4 = {}^{155}/_8$). The response also shows correct calculations to determine how much of the increase will be red plums ($^2/_5 \times {}^{155}/_8 = {}^{310}/_{40}$). However, the solution is shown as an improper fraction instead of a mixed number.

Last year, Bob's Market ordered $15\frac{1}{2}$ pounds of plums from a local orchard. This year, the market plans to order $1\frac{1}{4}$ times as many pounds of plums as were ordered last year. They want $\frac{2}{5}$ of this order to be red plums. What is the total amount, in pounds, of red plums the market plans to order this year? Write your answer as a mixed number.

Show your work.

[Handwritten work:]

16
× 4
40
+ 24
64

16
× 5
80
+ 30
90

31
× 5
160
+ 5
165

18
× 7
70
+ 42
112

$\frac{31}{2} \times \frac{5}{4} = \frac{155}{8}$

3.875
5) 19.375
   15
   43
   40
   37
   35
   25
   25
   0

19 3/8
8) 155
   8
   75
   72
   3

3,8 7 5

155 / 13775

19   16
× 8   × 8
80   80
+ 72   + 48
152   128
3
155

Answer ___3,875___ **pounds**

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts and procedures in the task. The response correctly determines this year's total order ($^{31}/_2 \times {}^5/_4 = {}^{155}/_8$) and expresses the total as a mixed ($19^3/_8$) and decimal (19.375) number. However, the amount of red plums calculated is $^1/_5$ the total order instead of $^2/_5$ ($5\overline{)19.375}$, with 3.875 above). The solution is expressed as a decimal number rather than a mixed number.

Last year, Bob's Market ordered $15\frac{1}{2}$ pounds of plums from a local orchard. This year, the market plans to order $1\frac{1}{4}$ times as many pounds of plums as were ordered last year. They want $\frac{2}{5}$ of this order to be red plums. What is the total amount, in pounds, of red plums the market plans to order this year? Write your answer as a mixed number.

Show your work.

$15\frac{1}{2}$

$15\frac{1}{2}$ $\begin{array}{r} 31 \\ 2\overline{)31} \\ -2\downarrow \\ \hline 11 \\ -10 \\ \hline 1 \end{array}$ $1\frac{1}{4}$ $\frac{5}{4}$

$\begin{array}{r} 31 \\ \underline{5} \\ 155 \end{array}$

$\dfrac{31}{2} \times \dfrac{5}{4} = \dfrac{155}{8}$

$19\frac{3}{8}$ $\begin{array}{r} 19\frac{3}{8} \\ 8\overline{)155} \\ -8\downarrow \\ \hline 75 \\ -72 \\ \hline 3 \end{array}$

$\dfrac{155}{8} \div \dfrac{2}{5}$

$\begin{array}{r} 155 \\ \underline{5} \\ 775 \end{array}$

$\dfrac{155}{8} \times \dfrac{5}{2} = \dfrac{775}{16}$

$\begin{array}{r} 48\frac{7}{16} \\ 16\overline{)775} \\ -64\downarrow \\ \hline 135 \\ -128 \\ \hline 7 \end{array}$

Answer _____ $19\frac{3}{8}$ _____ **pounds**

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts and procedures in the task. The response shows last year's order, 15½ pounds, expressed as an improper fraction and multiplied by the planned increase ($^{31}/_2 \times {}^5/_4 = {}^{155}/_8$). $^{155}/_{16}$ is converted into a mixed number and provided as the solution ($19^3/_8$).

Last year, Bob's Market ordered $15\frac{1}{2}$ pounds of plums from a local orchard. This year, the market plans to order $1\frac{1}{4}$ times as many pounds of plums as were ordered last year. They want $\frac{2}{5}$ of this order to be red plums. What is the total amount, in pounds, of red plums the market plans to order this year? Write your answer as a mixed number.

Show your work.

$$\frac{5}{4} \times \frac{31}{2} = \frac{155}{8}$$

$$\frac{155}{8} \div \frac{2}{5} = \frac{310}{40}$$

$$102 \frac{3}{8}$$

Answer $77\frac{3}{4} \text{ or } \frac{1}{2}$ pounds

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts and procedures in the task. The response shows last year's order, 15¹/₂ pounds, expressed as an improper fraction and multiplied by the planned increase (⁵/₄ × ³¹/₂ = ¹⁵⁵/₈). The response also shows calculations to determine how much of the increased order will be red plums (¹⁵⁵/₈ ÷ ²/₅ = ³¹⁰/₄₀); however, the incorrect operation is indicated by the division symbol and the conversion from an improper fraction to a mixed number is incorrect.

Last year, Bob's Market ordered $15\frac{1}{2}$ pounds of plums from a local orchard. This year, the market plans to order $1\frac{1}{4}$ times as many pounds of plums as were ordered last year. They want $\frac{2}{5}$ of this order to be red plums. What is the total amount, in pounds, of red plums the market plans to order this year? Write your answer as a mixed number.

Show your work.

Step1

1 whole $\frac{1}{4}$

$16\frac{1}{2} \times 1\frac{1}{4} = 15\frac{1}{4}$

Step3

$15\frac{1}{4}$ ... $2\frac{4}{5}$ ...
$\frac{4}{5} = 20$ ... $5\frac{4}{5} = 20$

Step5

$15\frac{5}{20} + \frac{8}{20} = 15\frac{13}{20}$

$15\frac{13}{20}$

$15\frac{13}{20}$ Pounds of Plums

Answer

Step6

Answer $15\frac{13}{20}$ **pounds**

Score Point 0 (out of 3 points)

This response is incorrect. Although the response shows a correct mathematical procedure ($15^{1}/_{2} \times 1^{1}/_{4}$), holistically this alone is not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task.

Last year, Bob's Market ordered $15\frac{1}{2}$ pounds of plums from a local orchard. This year, the market plans to order $1\frac{1}{4}$ times as many pounds of plums as were ordered last year. They want $\frac{2}{5}$ of this order to be red plums. What is the total amount, in pounds, of red plums the market plans to order this year? Write your answer as a mixed number.

Show your work.

$15\frac{1}{2}$ $\frac{31}{2} \div \frac{5}{4} =$ K C F

$\|$

$\frac{31}{2} \times \frac{4}{5} = \frac{124}{10} = 12\frac{4}{5}$

K C F

$\frac{64}{5} \div \frac{2}{5}$

$\begin{array}{r} 31 \\ \times 4 \\ \hline 124 \end{array}$

$\|$

$\frac{64}{5} \times \frac{5}{2} = \frac{320}{10} = 32$

$\|$

$\begin{array}{r} 2 \\ 64 \\ \times 5 \\ \hline 320 \end{array}$

$31\frac{10}{10}$

Answer ____$31\frac{10}{10}$____ pounds

Score Point 0 (out of 3 points)

This response is incorrect. Holistically, the mathematical procedures shown are not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task.

Ann and Margie had a total of 3 gallons of paint to share for a project. They had 1 gallon each of red paint, blue paint, and yellow paint.

- To complete the project, Ann used $\frac{3}{8}$ of the red paint, $\frac{1}{4}$ of the blue paint, and $\frac{1}{2}$ of the yellow paint.
- To complete the project, Margie used $\frac{1}{2}$ of the red paint, $\frac{5}{8}$ of the blue paint, and $\frac{1}{8}$ of the yellow paint.

How many total gallons of each color of paint were left after both girls had finished the project?

Show your work.

Answer Red:_____ gallons   Blue:_____ gallons   Yellow:_____ gallons

Using the leftover paint, Ann and Margie decide to make green paint. They mix the yellow and blue paint together to make the green paint. How many gallons of green paint can they make?

Answer _____ gallons

96

Measured CCLS: 5.NF.2

Commentary: This question measures 5.NF.2 because it assesses a student's ability to solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators.

Extended Rationale: This question asks the student to find the total number of gallons of paint left after Ann and Margie finished a project, each using different amounts of 3 gallons of paint. The student is also asked to find the amount of green paint that can be made if the remaining yellow paint and blue paint are combined. Students must include a set of computations to explain their process. As indicated in the rubric, student responses will be rated on whether they show sufficient work to indicate a thorough understanding of solving word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators. The determining factor in demonstrating a thorough understanding is using mathematically sound procedures to lead to a correct response.

The answers are Red = $\frac{1}{8}$, Blue = $\frac{1}{8}$, Yellow = $\frac{3}{8}$ for the first part and $\frac{1}{2}$ for the second part.

The answers to the first part can be determined by adding the amount of paint used for each color of paint and then subtracting this from 1 gallon:

$$\frac{3}{8} + \frac{4}{8} = \frac{7}{8}, \quad \frac{1}{4} + \frac{5}{8} = \frac{7}{8}, \quad \frac{1}{2} + \frac{1}{8} = \frac{5}{8}$$

$$\frac{8}{8} - \frac{7}{8} = \frac{1}{8}, \quad \frac{8}{8} - \frac{7}{8} = \frac{1}{8}, \quad \frac{8}{8} - \frac{5}{8} = \frac{3}{8}$$

The answer to the second part can then be determined by adding the leftover yellow amount, $\frac{3}{8}$, to the leftover blue amount, $\frac{1}{8}$:

$$\frac{3}{8} + \frac{1}{8} = \frac{4}{8} = \frac{1}{2}$$

Ann and Margie had a total of 3 gallons of paint to share for a project. They had 1 gallon each of red paint, blue paint, and yellow paint.

- To complete the project, Ann used $\frac{3}{8}$ of the red paint, $\frac{1}{4}$ of the blue paint, and $\frac{1}{2}$ of the yellow paint.
- To complete the project, Margie used $\frac{1}{2}$ of the red paint, $\frac{5}{8}$ of the blue paint, and $\frac{1}{8}$ of the yellow paint.

How many total gallons of each color of paint were left after both girls had finished the project?

Show your work.

Red

$$\frac{3}{8} \qquad \frac{8}{8}$$
$$+\frac{4}{8} \qquad -\frac{7}{8}$$
$$\frac{7}{8} \qquad \frac{1}{8}$$

Blue

$$\frac{2}{8} \qquad \frac{8}{8}$$
$$\frac{5}{8} \qquad \frac{7}{8}$$
$$+\frac{}{8} \qquad -\frac{}{8}$$
$$\frac{7}{8} \qquad \frac{1}{8}$$

Yellow

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

Answer Red: $\frac{1}{8}$ gallons Blue: $\frac{1}{8}$ gallons Yellow: $\frac{3}{8}$ gallons

Using the leftover paint, Ann and Margie decide to make green paint. They mix the yellow and blue paint together to make the green paint. How many gallons of green paint can they make?

$$\frac{3}{8}$$
$$+\frac{1}{8}$$
$$\frac{4}{8} = \frac{1}{2}$$

Answer $\frac{1}{2}$ gallons

Score Point 3 (out of 3 points)

This response includes correct solutions to the questions and demonstrates a thorough understanding of the mathematical concepts and procedures in the tasks. The first part shows the addition of the fractional amounts of each color of paint that each girl used. The response also shows the sum of each color of paint subtracted from 1 (⁸/₈) to accurately calculate the amount of paint left (¹/₈ gallons of red paint, ¹/₈ gallons of blue paint, and ³/₈ gallons of yellow paint). In the second part, a correct solution (¹/₂) is provided. Work is not required for the second part and per scoring policy #11, any work shown in the second part will not be scored.

Ann and Margie had a total of 3 gallons of paint to share for a project. They had 1 gallon each of red paint, blue paint, and yellow paint.

- To complete the project, Ann used $\frac{3}{8}$ of the red paint, $\frac{1}{4}$ of the blue paint, and $\frac{1}{2}$ of the yellow paint.
- To complete the project, Margie used $\frac{1}{2}$ of the red paint, $\frac{5}{8}$ of the blue paint, and $\frac{1}{8}$ of the yellow paint.

How many total gallons of each color of paint were left after both girls had finished the project?

Show your work.

Answer Red: $\frac{1}{8}$ gallons Blue: $\frac{1}{8}$ gallons Yellow: $\frac{3}{8}$ gallons

Using the leftover paint, Ann and Margie decide to make green paint. They mix the yellow and blue paint together to make the green paint. How many gallons of green paint can they make?

$\frac{3}{8}$
$+ \frac{1}{8}$
$\frac{4}{8}$ $\frac{1}{2}$

yellow : $\frac{3}{8}$ gallons
blue : $\frac{1}{8}$ gallons

$\frac{4}{8} \div \frac{4}{4} = \frac{1}{2}$
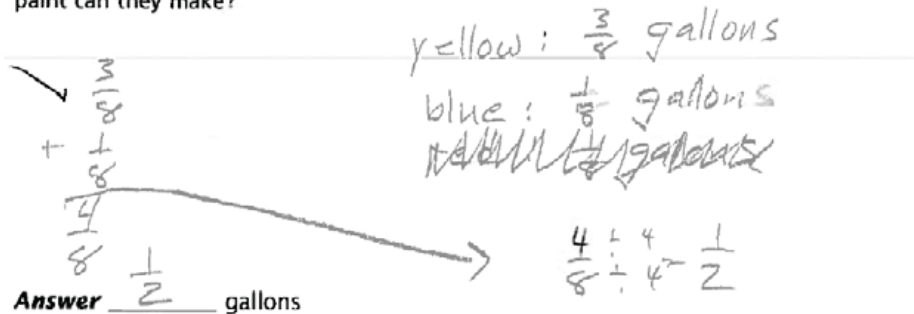
Answer $\frac{1}{2}$ gallons

Score Point 3 (out of 3 points)

This response includes correct solutions to the questions and demonstrates a thorough understanding of the mathematical concepts and procedures in the tasks. The first part shows diagrams representing the fractional amount of each color of paint used by each girl, and the correct amounts left ($\frac{1}{8}$ gallons of red paint, $\frac{1}{8}$ gallons of blue paint, and $\frac{3}{8}$ gallons of yellow paint) are shown. In the second part, a correct solution ($\frac{1}{2}$) is provided. Work is not required for the second part and per scoring policy #11, any work shown in the second part will not be scored.

Confusing

Ann and Margie had a total of 3 gallons of paint to share for a project. They had 1 gallon each of red paint, blue paint, and yellow paint.

- To complete the project, Ann used $\frac{3}{8}$ of the red paint, $\frac{1}{4}$ of the blue paint, and $\frac{1}{2}$ of the yellow paint.

- To complete the project, Margie used $\frac{1}{2}$ of the red paint, $\frac{5}{8}$ of the blue paint, and $\frac{1}{8}$ of the yellow paint.

How many total gallons of each color of paint were left after both girls had finished the project?

Show your work.

$$\frac{3}{8} \qquad \frac{3}{8}$$
$$-\frac{1 \times 4}{2 \times 4} \qquad \frac{4}{8}$$
$$+ \qquad \overline{}$$
$$\frac{}{8}$$

$$\frac{1 \times 2}{4 \times 2} \qquad \frac{2}{8}$$
$$+\frac{5}{8} \qquad \frac{5}{8}$$
$$\overline{}$$
$$\frac{7}{8}$$

$$\frac{1 \times 4}{2 \times 4} \qquad \frac{4}{8}$$
$$+\frac{1}{8} \qquad \frac{1}{8}$$
$$\overline{}$$
$$\frac{5}{8}$$

Answer Red: $\frac{1}{8}$ gallons   Blue: $\frac{1}{8}$ gallons   Yellow: $\frac{3}{8}$ gallons

Using the leftover paint, Ann and Margie decide to make green paint. They mix the yellow and blue paint together to make the green paint. How many gallons of green paint can they make?

$$\frac{1 \times 7}{8 \times 7} \qquad \frac{7}{56}$$
$$+\frac{3 \times 8}{7 \times 8} \qquad \frac{24}{56}$$
$$\overline{}$$
$$\frac{31}{56}$$

$$\frac{7}{56} - \frac{3}{6}$$

$$\frac{56}{-31}$$
$$\overline{25}$$

Answer $\frac{25}{56}$ gallons

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The response shows the addition of the fractional amount of each color of paint that each girl used, and the correct amount of leftover paint of each paint color is shown. It is not necessary to show the subtraction of the paint used from the original one gallon of paint. The solution for the second part is incorrect.

Ann and Margie had a total of 3 gallons of paint to share for a project. They had 1 gallon each of red paint, blue paint, and yellow paint.

- To complete the project, Ann used $\frac{3}{8}$ of the red paint, $\frac{1}{4}$ of the blue paint, and $\frac{1}{2}$ of the yellow paint.
- To complete the project, Margie used $\frac{1}{2}$ of the red paint, $\frac{5}{8}$ of the blue paint, and $\frac{1}{8}$ of the yellow paint.

How many total gallons of each color of paint were left after both girls had finished the project?

Show your work.

$$\frac{3}{8} + \frac{4}{8} = \frac{7}{8}$$

$$\frac{1}{4} = \frac{2}{8} + \frac{5}{8} = \frac{7}{8}$$

$$\frac{1}{2} = \frac{4}{8} + \frac{1}{8} = \frac{5}{8}$$

Answer Red: $\frac{1}{8}$ gallons Blue: $\frac{1}{8}$ gallons Yellow: $\frac{2}{8}$ gallons

Using the leftover paint, Ann and Margie decide to make green paint. They mix the yellow and blue paint together to make the green paint. How many gallons of green paint can they make?

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

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The response shows the fractional amount of paint used by one girl converted to an equivalent fraction and with a common denominator added to the amount used by the other girl. Showing the subtraction from the original one gallon of paint is not necessary. The correct amounts of leftover paint are shown for the red and blue paint. An incorrect amount of leftover paint is shown for the yellow paint. In the second part, the fraction shown is the correct sum of the yellow and blue paint amounts calculated in the first part.

Ann and Margie had a total of 3 gallons of paint to share for a project. They had 1 gallon each of red paint, blue paint, and yellow paint.

- To complete the project, Ann used $\frac{3}{8}$ of the red paint, $\frac{1}{4}$ of the blue paint, and $\frac{1}{2}$ of the yellow paint.

- To complete the project, Margie used $\frac{1}{2}$ of the red paint, $\frac{5}{8}$ of the blue paint, and $\frac{1}{8}$ of the yellow paint.

How many total gallons of each color of paint were left after both girls had finished the project?

Show your work.

$$\frac{3}{8} \times \frac{1}{1} = \frac{3}{8} \qquad \frac{1}{4} \times \frac{2}{2} = \frac{2}{8} \qquad \frac{1}{2} \times \frac{4}{4} = \frac{4}{8}$$

$$+\frac{1}{2} \times \frac{4}{4} = \frac{4}{8} \qquad +\frac{5}{8} \times \frac{1}{1} = \frac{5}{8} \qquad +\frac{1}{8} \times \frac{1}{1} = \frac{1}{8}$$

| red | $\frac{7}{8}$ |

| blue | $\frac{7}{8}$ |

| yellow | $\frac{5}{8}$ |

Answer Red: $\frac{7}{8}$ gallons Blue: $\frac{7}{8}$ gallons Yellow: $\frac{5}{8}$ gallons

Using the leftover paint, Ann and Margie decide to make green paint. They mix the yellow and blue paint together to make the green paint. How many gallons of green paint can they make?

$$\frac{7}{8} \times \frac{1}{1} = \frac{7}{8} \qquad \qquad 1\frac{3}{4} \times \frac{2}{2} = \frac{6}{8}$$

$$+\frac{7}{8} \times \frac{1}{1} = \frac{7}{8} \qquad \qquad \frac{5}{8} + \frac{1}{1} = \frac{5}{8}$$

$$\frac{14}{8} = 1 \qquad \frac{6}{8} = \frac{3}{4} \qquad \boxed{2\frac{3}{8}} \quad \frac{11}{8} \sim 1\frac{3}{8}$$

$$2\frac{3}{8}$$

Answer $2\frac{3}{8}$ gallons

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts embodied in the task. In the first part, the response shows the fractional amount of paint used by one girl converted to an equivalent fraction and with a common denominator added to the amount used by the other girl. However, the sums are not subtracted from the original quantity of paint, resulting in incorrect solutions. The solution in the second part is not consistent with the leftover paint shown in the first part.

Ann and Margie had a total of 3 gallons of paint to share for a project. They had 1 gallon each of red paint, blue paint, and yellow paint.

- To complete the project, Ann used $\frac{3}{8}$ of the red paint, $\frac{1}{4}$ of the blue paint, and $\frac{1}{2}$ of the yellow paint.
- To complete the project, Margie used $\frac{1}{2}$ of the red paint, $\frac{5}{8}$ of the blue paint, and $\frac{1}{8}$ of the yellow paint.

How many total gallons of each color of paint were left after both girls had finished the project?

Show your work.

$\frac{1}{2} \times \frac{4}{} = \frac{8}{}$
$\frac{1}{2} \times \frac{4}{} = 16$
$\frac{3}{8} \times \frac{2}{} = \frac{6}{}$
$\frac{3}{8} \times \frac{2}{} = 16$

$\frac{2}{16}$

$\frac{1}{4} \times \frac{2}{2} = \frac{2}{8}$

$-\frac{5}{8}$

$\frac{3}{8}$

$\frac{1 \times 4}{2 \times 4} = \frac{4}{8}$

$-\frac{1}{8}$

$\frac{3}{8}$

Answer Red: $\frac{2}{16}$ gallons   Blue: $\frac{3}{8}$ gallons   Yellow: $\frac{3}{8}$ gallons

Using the leftover paint, Ann and Margie decide to make green paint. They mix the yellow and blue paint together to make the green paint. How many gallons of green paint can they make?

$+ \frac{\frac{3}{8}}{\frac{3}{8}}$

$\frac{6}{8} = \frac{3}{4}$

Answer $\frac{3}{4}$ gallons

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts embodied in the task. In the first part, correct quantities of leftover paint are shown for two colors, red and yellow; however, the work shows an incorrect procedure, calculating the differences in the amounts of paint the girls used, so no credit is earned. The solution in the second part (³/₄) is the correct sum of the amount of yellow and blue paint shown in the first part.

Ann and Margie had a total of 3 gallons of paint to share for a project. They had 1 gallon each of red paint, blue paint, and yellow paint.

- To complete the project, Ann used $\frac{3}{8}$ of the red paint, $\frac{1}{4}$ of the blue paint, and $\frac{1}{2}$ of the yellow paint.
- To complete the project, Margie used $\frac{1}{2}$ of the red paint, $\frac{5}{8}$ of the blue paint, and $\frac{1}{8}$ of the yellow paint.

How many total gallons of each color of paint were left after both girls had finished the project?

Show your work.

$$\frac{4}{0} - \frac{3}{8} - \frac{1}{2} = \frac{0}{6} \qquad \frac{4}{0} \frac{-1}{8} \frac{1}{2} =$$

$$\frac{2}{6}$$

$$\frac{4}{0} - \frac{5}{8} - \frac{1}{4} = \frac{0}{4}$$

Answer Red: $\frac{0}{6}$ gallons Blue: $\frac{0}{4}$ gallons Yellow: $\frac{2}{6}$ gallons

Using the leftover paint, Ann and Margie decide to make green paint. They mix the yellow and blue paint together to make the green paint. How many gallons of green paint can they make?

$$\frac{0}{4} + \frac{2}{6} = \frac{2}{10}$$

Answer $\frac{2}{10}$ gallons

Score Point 0 (out of 3 points)

This response is incorrect. The mathematical procedures shown are not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task.

Ann and Margie had a total of 3 gallons of paint to share for a project. They had 1 gallon each of red paint, blue paint, and yellow paint.

- To complete the project, Ann used $\frac{3}{8}$ of the red paint, $\frac{1}{4}$ of the blue paint, and $\frac{1}{2}$ of the yellow paint.
- To complete the project, Margie used $\frac{1}{2}$ of the red paint, $\frac{5}{8}$ of the blue paint, and $\frac{1}{8}$ of the yellow paint.

How many total gallons of each color of paint were left after both girls had finished the project?

Show your work.

$$\frac{3}{8} + \frac{1}{2} = \frac{4}{10} \quad red$$

$$\frac{1}{4} + \frac{5}{8} = \frac{6}{12} \quad blue$$

$$\frac{1}{2} + \frac{1}{8} = \frac{2}{10}$$

Answer Red: $\frac{4}{10}$ gallons Blue: $\frac{6}{12}$ gallons Yellow: $\frac{2}{10}$ gallons

Using the leftover paint, Ann and Margie decide to make green paint. They mix the yellow and blue paint together to make the green paint. How many gallons of green paint can they make?

Answer $\frac{8}{22}$ gallons

Score Point 0 (out of 3 points)

This response is incorrect. The mathematical procedures shown are not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task.

2-Point Holistic Rubric

Score Points:

2 Points	A two-point response includes the correct solution to the question and demonstrates a thorough understanding of the mathematical concepts and/or procedures in the task. This response • indicates that the student has completed the task correctly, using mathematically sound procedures • contains sufficient work to demonstrate a thorough understanding of the mathematical concepts and/or procedures • may contain inconsequential errors that do not detract from the correct solution and the demonstration of a thorough understanding
1 Point	A one-point response demonstrates only a partial understanding of the mathematical concepts and/or procedures in the task. This response • correctly addresses only some elements of the task • may contain an incorrect solution but applies a mathematically appropriate process • may contain the correct solution but required work is incomplete
0 Points*	A zero-point response is incorrect, irrelevant, incoherent, or contains a correct solution obtained using an obviously incorrect procedure. Although some elements may contain correct mathematical procedures, holistically they are not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task.

* Condition Code A is applied whenever a student who is present for a test session leaves an entire constructed-response question in that session completely blank (no response attempted).

3-Point Holistic Rubric

Score Points:

3 Points	A three-point response includes the correct solution(s) to the question and demonstrates a thorough understanding of the mathematical concepts and/or procedures in the task. This response • indicates that the student has completed the task correctly, using mathematically sound procedures • contains sufficient work to demonstrate a thorough understanding of the mathematical concepts and/or procedures • may contain inconsequential errors that do not detract from the correct solution(s) and the demonstration of a thorough understanding
2 Points	A two-point response demonstrates a partial understanding of the mathematical concepts and/or procedures in the task. This response • appropriately addresses most, but not all aspects of the task using mathematically sound procedures • may contain an incorrect solution but provides sound procedures, reasoning, and/or explanations • may reflect some minor misunderstanding of the underlying mathematical concepts and/or procedures
1 Point	A one-point response demonstrates only a limited understanding of the mathematical concepts and/or procedures in the task. This response • may address some elements of the task correctly but reaches an inadequate solution and/or provides reasoning that is faulty or incomplete • exhibits multiple flaws related to misunderstanding of important aspects of the task, misuse of mathematical procedures, or faulty mathematical reasoning • reflects a lack of essential understanding of the underlying mathematical concepts • may contain the correct solution(s) but required work is limited
0 Points*	A zero-point response is incorrect, irrelevant, incoherent, or contains a correct solution obtained using an obviously incorrect procedure. Although some elements may contain correct mathematical procedures, holistically they are not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task.

* Condition Code A is applied whenever a student who is present for a test session leaves an entire constructed-response question in that session completely blank (no response attempted).

2014 2- and 3-Point Mathematics Scoring Policies

Below are the policies to be followed while scoring the mathematics tests for all grades:

1. If a student does the work in other than a designated "Show your work" area, that work should still be scored. (Additional paper is an allowable accommodation for a student with disabilities if indicated on the student's Individual Education Program or Section 504 Accommodation Plan.)

2. If the question requires students to show their work, and the student shows appropriate work and clearly identifies a correct answer but fails to write that answer in the answer blank, the student should still receive full credit.

3. In questions that provide ruled lines for students to write an explanation of their work, mathematical work shown elsewhere on the page should be considered and scored.

4. If the student provides one legible response (and one response only), teachers should score the response, even if it has been crossed out.

5. If the student has written more than one response but has crossed some out, teachers should score only the response that has **not** been crossed out.

6. Trial-and-error responses are **not** subject to Scoring Policy #5 above, since crossing out is part of the trial-and-error process.

7. If a response shows repeated occurrences of the same conceptual error within a question, the student should **not** be penalized more than once.

8. In questions that require students to provide bar graphs,

    -   in Grades 3 and 4 only, touching bars are acceptable
    -   in Grades 3 and 4 only, space between bars does **not** need to be uniform
    -   in all grades, widths of the bars must be consistent
    -   in all grades, bars must be aligned with their labels
    -   in all grades, scales must begin at 0, but the 0 does **not** need to be written

9. In questions requiring number sentences, the number sentences must be written horizontally.

10. In pictographs, the student is permitted to use a symbol other than the one in the key, provided that the symbol is used consistently in the pictograph; the student does not need to change the symbol in the key. The student may **not**, however, use multiple symbols within the chart, nor may the student change the value of the symbol in the key.

11. If students are not directed to show work, any work shown will not be scored. This applies to items that do not ask for any work and items that ask for work for one part and do not ask for work in another part.

12. Condition Code A is applied whenever a student who is present for a test session leaves an entire constructed-response question in that session completely blank (no response attempted). This is not to be confused with a score of zero wherein the student does respond to part or all of the question but that work results in a score of zero.