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New York State Testing Program
Grade 4 Common Core
Mathematics Test

Released Questions with Annotations

August 2014

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Grade 4 Common Core
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 on 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 the student's 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 4 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 model is shaded to represent a fraction equivalent to $\frac{1}{2}$?
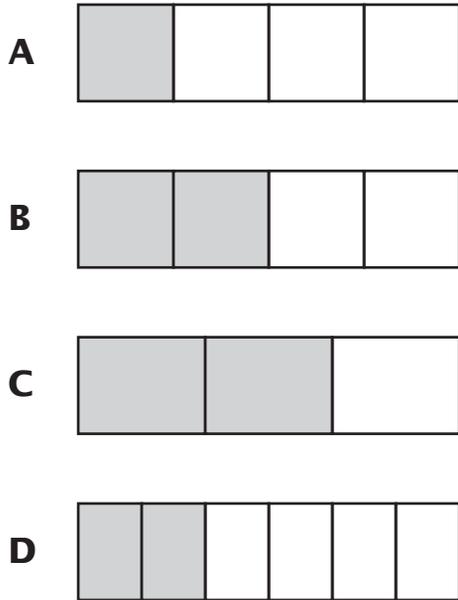
A

B

C

D

Key: B
Measured CCLS: 4.NF.1

Commentary: This question measures 4.NF.1 by asking the student to understand the principle that a fraction *a* / *b* is equivalent to fraction (*n* × *a*) / (*n* × *b*) by using visual fraction models, with attention to how the number and size of parts differ even though the two fractions themselves are the same size, and use this principle to recognize and generate equivalent fractions.

Extended Rationale

Answer Choice A: This response may reflect a lack of understanding of how to interpret the numerator and denominator in a fraction. The student may have seen that the numerator was 1 and chose the figure that had 1 part shaded, without understanding how to interpret the denominator. The student who selects this response may not understand how to interpret fractions or how to recognize and generate equivalent fractions.

Answer Choice B: This is the correct representation of a fraction equivalent to $\frac{1}{2}$. The student may have understood that an equivalent fraction can be generated by multiplying a fraction by $\frac{n}{n}$, or the student may have recognized the figure that showed $\frac{1}{2}$ of it shaded. The student who selects this response understands how to recognize and generate equivalent fractions using a visual model.

Answer Choice C: This response may reflect a lack of understanding of how to generate an equivalent fraction. The student may have incorrectly assumed that an equivalent fraction is generated when the same number is added to, rather than multiplied by, the numerator and denominator. The student who selects this response may not understand how to recognize and generate equivalent fractions.

Answer Choice D: This response may reflect a lack of understanding of how to generate an equivalent fraction. The student may have misinterpreted the denominator as the number of unshaded parts and then doubled the numerator and the denominator. The student who selects this response may not understand how to recognize and generate equivalent fractions.

Answer choices A, C, and D are plausible but incorrect. They represent common student errors made when attempting to understand and generate equivalent fractions using the principle that fraction a / b is equivalent to fraction $(n \times a)$ / $(n \times b)$ by using visual fraction models.

What is 735,286 rounded to the nearest ten thousand?

A 700,000

B 730,000

C 735,000

D 740,000

Key: D
Measured CCLS: 4.NBT.3

Commentary: This question measures 4.NBT.3 by asking the student to use place-value understanding to round a multi-digit number to the ten thousands place.

Extended Rationale

Answer Choice A: "700,000"; This response may reflect a lack of complete understanding of place value. The student may have mistaken the ten thousands place for the hundred thousands place. The student who selects this response may not understand how to determine the place value of a digit.

Answer Choice B: "730,000"; This response may reflect a lack of understanding of when it is appropriate to round down and when it is appropriate to round up. The student may have thought that the digit 5 in the thousands place indicates that the number should be rounded down. The student who selects this response may not understand how to determine whether a number should be rounded up to the next place value.

Answer Choice C: "735,000"; This response may reflect a lack of complete understanding of place value. The student may have mistaken the thousands place for the ten thousands place. The student who selects this response may not understand how to determine the place value of a digit.

Answer Choice D: "740,000"; This is the correct response that shows 735,286 rounded to the nearest ten thousand. The student may have understood that the digit in the thousands place determines whether the number will be rounded up or down. The student who selects this response understands how to use place value understanding to round a multi-digit number to the ten thousands place.

Answer choices A, B, and C are plausible but incorrect. They represent common student errors made when using place value understanding to round a multi-digit number to the ten thousands place.

3

The figure below has a perimeter of 37 feet.
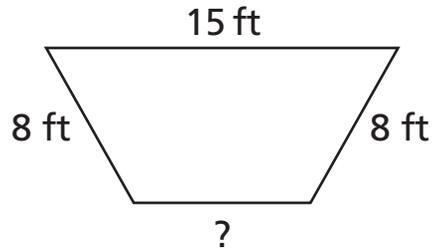
What is the length, in feet, of the unknown side?

A 6

B 8

C 14

D 31

Key: A
Measured CCLS: 3.MD.8

Commentary: This question measures 3.MD.8 by asking the student to solve a mathematical problem to find an unknown side length of a polygon given the perimeter of the polygon. Standard 3.MD.8 is designated as May-to-June in Grade 3. As indicated in the educator guide, individual test questions may assess standards from previous grades.

Extended Rationale

Answer Choice A: "6"; This is the correct length of the missing side of the polygon. The student may have understood that the perimeter of a polygon is the sum of the lengths of all of its sides and added the given side lengths, 8 + 8 + 15 = 31, and then subtracted that from the total perimeter of the polygon, 37 – 31 = 6. The student who selects this response understands how to solve a mathematical problem to find an unknown side length of a polygon given the perimeter of the polygon.

Answer Choice B: "8"; This response may reflect a lack of understanding of how to determine perimeter and lack of understanding of attributes of polygons. The student may have incorrectly determined that three of the four sides of the polygon were equal in length, choosing 8 as the missing side length. The student who selects this response may not understand how to solve a mathematical problem to find an unknown side length of a polygon given the perimeter of the polygon.

Answer Choice C: "14"; This response may reflect a lack of understanding of how to find the perimeter of a polygon. The student may have added only 15 and one of the side lengths of 8 before subtracting from 37. The student who selects this response may not understand how to solve a mathematical problem to find an unknown side length of a polygon given the perimeter of the polygon.

Answer Choice D: "31"; This response may reflect a lack of understanding of how to find the perimeter of a polygon. The student may have only added the given side lengths for the polygon, without considering the

fourth, missing side length. The student who selects this response may not understand how to solve a mathematical problem to find an unknown side length of a polygon given the perimeter of the polygon.

Answer choices B, C, and D are plausible but incorrect. They represent common student errors made when solving a mathematical problem to find an unknown side length of a polygon given the perimeter of the polygon.

Which figure appears to have one right angle?

A

B

C

D
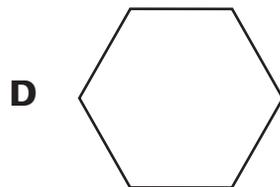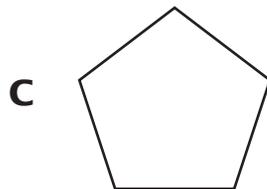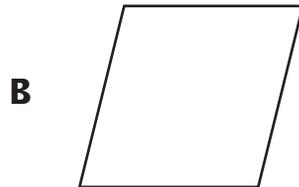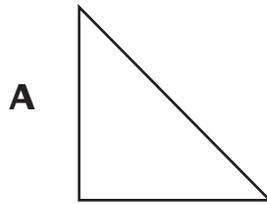
Key: A
Measured CCLS: 4.G.1

Commentary: This question measures 4.G.1 by asking the student to identify a right angle in a two-dimensional figure.

Extended Rationale

Answer Choice A: This response correctly identifies a figure that appears to have one right angle. The student may understand that a right angle equals 90° or that a right angle can be thought of visually as forming a square corner. The student who selects this response understands how to identify a right angle in a two-dimensional figure.

Answer Choice B: This response reflects an error in recognizing right angles. The student may not understand that a right angle equals 90° or that a right angle can be thought of visually as forming a square corner. The student who selects this response may not understand how to identify a right angle in a two-dimensional figure.

Answer Choice C: This response reflects an error in recognizing right angles. The student may not understand that a right angle equals 90° or that a right angle can be thought of visually as forming a square corner. The student who selects this response may not understand how to identify a right angle in a two-dimensional figure.

Answer Choice D: This response reflects an error in recognizing right angles. The student may not understand that a right angle equals 90° or that a right angle can be thought of visually as forming a square corner. The student who selects this response may not understand how to identify a right angle in a two-dimensional figure.

Answer choices B, C, and D are plausible but incorrect. They represent common student errors made when identifying a right angle in a two-dimensional figure.

In the number 344,586, how many times greater is the value represented by the 4 in the ten thousands place than the value represented by the 4 in the thousands place?

A 1

B 10

C 1,000

D 10,000

Key: B
Measured CCLS: 4.NBT.1

Commentary: This question measures 4.NBT.1 by asking the student to recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.

Extended Rationale

Answer Choice A: "1"; This response may reflect a lack of understanding of the value of digits according to their place value. The student may have determined that the digit 4 in the thousands place is one place to the right of the digit 4 in the ten-thousands place, rather than finding how many times greater the value is in the ten-thousands place. The student who selects this response may not understand that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.

Answer Choice B: "10"; This is the correct number that can be multiplied by the value of the digit 4 in the thousands place to get the value of the digit 4 in the ten-thousands place. The student may have understood that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. The student who selects this response understands how to compare the value of digits given their place value.

Answer Choice C: "1,000"; This response may reflect a lack of understanding of how to compare the values of digits in different places. The student may have assumed that 10,000 would be a valid response, since there is a 4 in the ten thousands place. The student who selects this response may not understand that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.

Answer Choice D: "10,000"; This response may reflect a lack of understanding of how to compare the values of digits in different places. The student may have assumed that 1,000 would be a valid response, since there is a 4 in the thousands place. The student who selects this response may not understand that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.

Answer choices A, C, and D are plausible but incorrect. They represent common student errors made when understanding that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.

The fraction model below represents 6 whole units.
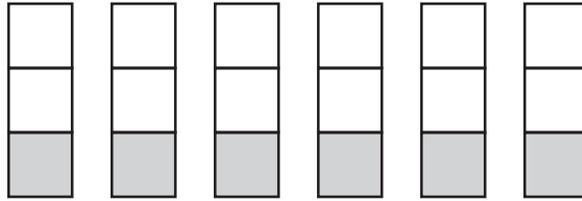
Which number sentence represents the amount of the fraction model that is shaded?

A $6 \times \dfrac{1}{2} =$ ___?___

B $6 \times \dfrac{1}{3} =$ ___?___

C $3 \times \dfrac{1}{6} =$ ___?___

D $3 \times \dfrac{1}{2} =$ ___?___

Key: B
Measured 4.NF.4.a

Commentary: This question measures 4.NF.4.a by asking the student to understand a fraction a / b as a multiple of $1 / b$.

Extended Rationale

Answer Choice A: "$6 \times \dfrac{1}{2} =$ ___?___"; This response may reflect a lack of understanding of how a fraction a / b can be represented using multiplication. The student may have interpreted the presence of 1 shaded part and 2 unshaded parts as a fraction of $\dfrac{1}{2}$. The student who selects this response may not understand a fraction a / b as a multiple of $1 / b$.

Answer Choice B: "$6 \times \dfrac{1}{3} =$ ___?___"; This is the correct number sentence that represents the amount of the fraction model that is shaded. The student may have understood that each of the 6 wholes in the model is shaded to show $\dfrac{1}{3}$. The student who selects this response understands a fraction a / b as a multiple of $1 / b$.

Answer Choice C: "$3 \times \dfrac{1}{6} =$ ___?___"; This response may reflect a lack of understanding of how a fraction a / b can be represented using multiplication. The student may have multiplied the number of parts of each whole by a fraction representing 1 shaded part and 6 total wholes. The student who selects this response may not understand a fraction a / b as a multiple of $1 / b$.

Answer Choice D: "$3 \times \dfrac{1}{2} =$ ___?___"; This response may reflect a lack of understanding of how a fraction a / b can be represented using multiplication. The student may have multiplied the number of parts per whole by 1

9

shaded section to 2 unshaded sections. The student who selects this response may not understand a fraction *a* / *b* as a multiple of 1 / *b*.

Answer choices A, C, and D are plausible but incorrect. They represent common student errors made when understanding a fraction *a* / *b* as a multiple of 1 / *b*.

A school has 17 tables in the cafeteria. Each table seats 12 students. What is the greatest number of students that can be seated at these tables?

A 114

B 184

C 194

D 204

Key: D
Measured CCLS: 4.NBT.5

Commentary: This question measures 4.NBT.5 by asking the student to multiply two two-digit numbers using strategies based on place value and the properties of operations. In this case, two-digit multiplication is used to solve a real-world problem.

Extended Rationale

Answer Choice A: "114"; This response may reflect an incomplete understanding of multiplication of two-digit numbers. The student may have only multiplied 7 by 2 to get 14 and 10 by 10 to get 100, then added these together. The student who selects this response may not understand how to multiply two two-digit numbers using strategies based on place value and the properties of operations.

$(2 \times 7 = 14 + 10 \times 10 = 100) = 114$

Answer Choice B: "184"; This response may reflect an incomplete understanding of multiplication of two-digit numbers. The student may have multiplied 7 by 2 to get 14 and 17 by 10 to get 170, then added these together. The student who selects this response may not understand how to multiply two two-digit numbers using strategies based on place value and the properties of operations.

$17 \times 12 = 14 + 170 = 184$

Answer Choice C: "194"; This response may reflect an incomplete understanding of multiplication of two-digit numbers. The student may have used the traditional algorithm for multiplication but may not have regrouped correctly when multiplying 7 by 2. The student who selects this response may not understand how to multiply two two-digit numbers using strategies based on place value and the properties of operations.

$17 \times 12 = 24 + 170 = 194$

Answer Choice D: "204"; This response shows the correct result when 17 is multiplied by 12. The student who selects this response understands how to multiply two two-digit numbers using strategies based on place value and the properties of operations.

Answer choices A, B, and C are plausible but incorrect. They represent common student errors made when multiplying two two-digit numbers using strategies based on place value and the properties of operations.

Which expression represents the number 13,809 written in expanded form?

A $13 + 80 + 9$

B $13,000 + 800 + 90$

C $9 + 1,300 + 80$

D $3,000 + 10,000 + 9 + 800$

Key: D
Measured CCLS: 4.NBT.2

Commentary: This question measures 4.NBT.2 by asking the student to read and write multi-digit whole numbers using expanded form.

Extended Rationale

Answer Choice A: "13 + 80 + 9"; This response may reflect a lack of understanding of how to interpret place value. The student may have determined that the 5 digits in 13,809 are in the same order and have the same number of digits in 13 + 80 + 9. The student who selects this response may not understand how to interpret place value or that, when added, the numbers in expanded form should have the same value as 13,809.

Answer Choice B: "13,000 + 800 + 90"; This response may reflect a lack of understanding of how to interpret place value. The student may have confused the tens and ones places, changing the value of 9 to 90. The student who selects this response may not understand place value and how to read and write multi-digit whole numbers using expanded form.

Answer Choice C: "9 + 1,300 + 80"; This response may reflect a lack of understanding of how to interpret place value. The student may not have understood that each digit in the number 13,809 should be accounted for by its place value and confused 13,000 with 1,300. The student who selects this response may not understand place value and how to read and write multi-digit whole numbers using expanded form.

Answer Choice D: : "3,000 + 10,000 + 9 + 800"; This is the correct response that shows 13,809 written in expanded form. The student may have understood that in expanded form, each digit in the number 13,809 should be written to show its place value. The student who selects this response understands how to read and write multi-digit whole numbers using expanded form.

Answer choices A, B, and C are plausible but incorrect. They represent common student errors made when reading and writing multi-digit whole numbers using expanded form.

The measure of angle STV is 117°. What is the measure of angle UTV?
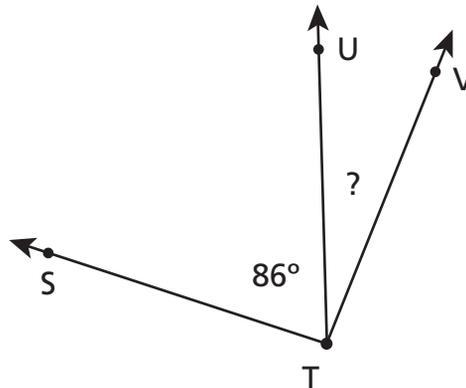
[not drawn to scale]

A 31°

B 63°

C 157°

D 203°

Key: A
Measured CCLS: 4.MD.7

Commentary: This question measures 4.MD.7 by asking the student to recognize angle measure as additive and solve addition and subtraction problems to find unknown angles on a diagram.

Extended Rationale

Answer Choice A: "31°"; This is the correct measure of angle UTV. The student may have understood that angle UTV should be added to angle STU to get to the total angle measurement for angle STV of 117°. The student may also have subtracted angle STU from angle STV to find the value of angle UTV. The student who selects this response understands how to recognize angle measure as additive and solve addition and subtraction problems to find unknown angles on a diagram.

Answer Choice B: "63°"; This response may reflect a lack of understanding of angle measurements. The student may have had the misconception that the measurement of angle STV is 180°, so subtracted 86 for angle STU from 180 to get 63 for angle UTV. The student who selects this response may not understand what a 180° angle looks like and how to use the given total measurement of an angle to find the measure of an unknown angle.

Answer Choice C: "157°"; This response may reflect a lack of understanding of angle measurements and how to find unknown angles on a diagram. The student may have thought that the entire angle should measure 360°, so subtracted 117 and 86 from 360° to find the measure of angle UTV. The student who selects this response may not understand angle measurement or how to solve addition and subtraction problems to find unknown angles on a diagram.

Answer Choice D: "203°"; This response may reflect a lack of complete understanding of angles measurements and how to find unknown angles in a diagram. The student may have added the two values given, 117 and 86, to get a total of 203. The student who selects this response may not understand how to solve addition and subtraction problems to find unknown angles on a diagram.

Answer choices B, C, and D are plausible but incorrect. They represent common student errors made when recognizing angle measure as additive and solving addition and subtraction problems to find unknown angles on a diagram.

Carter shaded the two same-sized models below to represent the fractions $\frac{2}{3}$ and $\frac{8}{12}$.
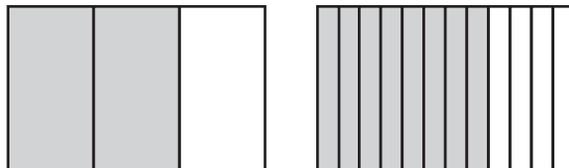
Carter believed that $\frac{2}{3}$ is equivalent to $\frac{8}{12}$. Why is he correct or incorrect?

A He is incorrect because the numerator and denominator are different in $\frac{2}{3}$ and $\frac{8}{12}$.

B He is incorrect because the numerator and denominator in $\frac{8}{12}$ are greater than in $\frac{2}{3}$.

C He is correct because adding the same number to the numerator and denominator in $\frac{2}{3}$ equals $\frac{8}{12}$.

D He is correct because multiplying the numerator and denominator in $\frac{2}{3}$ by the same number equals $\frac{8}{12}$.

Key: D
Measured CCLS: 4.NF.1

Commentary: This question measures 4.NF.1 by asking the student to understand the principle that fraction a / b is equivalent to fraction $(n \times a)$ / $(n \times b)$ by using visual fraction models, with attention to how the number and size of parts differ even though the two fractions themselves are the same size and use this principle to recognize and generate equivalent fractions.

Extended Rationale

Answer Choice A: "He is incorrect because the numerator and denominator are different in $\frac{2}{3}$ and $\frac{8}{12}$." This response is incorrect and may reflect a lack of understanding of how to interpret the numerator and denominator in a fraction and how to generate equivalent fractions. The student may have thought that equivalent fractions must have the same numerator and denominator. The student who selects this response may not understand how to interpret fractions or how to recognize and generate equivalent fractions.

Answer Choice B: "He is incorrect because the numerator and denominator in $\frac{8}{12}$ are greater than in $\frac{2}{3}$." This response is incorrect and may reflect a lack of understanding of how to interpret the numerator and denominator in a fraction and how to generate equivalent fractions. The student may have thought that

fractions can be compared by comparing the numerators and denominators separately. The student who selects this response may not understand how to interpret fractions or how to recognize and generate equivalent fractions.

Answer Choice C: "He is correct because adding the same number to the numerator and denominator in $\frac{2}{3}$ equals $\frac{8}{12}$." This response is incorrect and may reflect a lack of understanding of how to generate an equivalent fraction. The student may have incorrectly assumed that the same number (n / n) could be added to, rather than multiplied by, the numerator and denominator to generate an equivalent fraction. The student who selects this response may not understand how to generate equivalent fractions using the principle that fraction a / b is equivalent to fraction ($n \times a$) / ($n \times b$).

Answer Choice D: "He is correct because multiplying the numerator and denominator in $\frac{2}{3}$ by the same number equals $\frac{8}{12}$." This is the correct response that identifies the fractions as equivalent, along with an appropriate justification. The student may have understood that an equivalent fraction can be generated by multiplying a fraction by 1 (n / n). The student who selects this response understands how to generate equivalent fraction using the principle that fraction a / b is equivalent to fraction ($n \times a$) / ($n \times b$).

Answer choices A, B, and C are plausible but incorrect. They represent common student errors made when using the principle that fraction a / b is equivalent to fraction ($n \times a$) / ($n \times b$) to recognize and generate equivalent fractions.

Which figure appears to have exactly one line of symmetry?

A

B

C

D
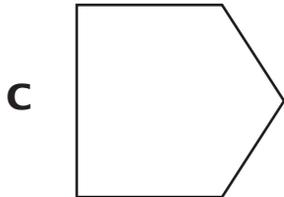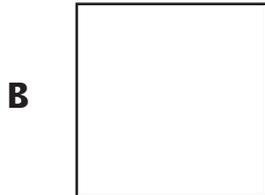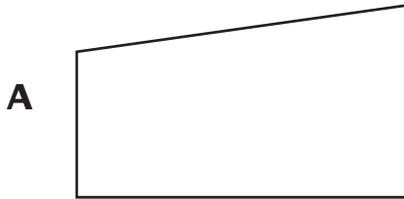
Key: C
Measured CCLS: 4.G.3

Commentary: This question measures 4.G.3 because it asks the student to recognize a line of symmetry for a two-dimensional figure as a line across the figure where the figure can be folded along the line into matching parts.

Extended Rationale

Answer Choice A: This response may reflect an error in identifying a line of symmetry. The student may have thought that a line could be drawn where this figure could be folded into matching parts or that a line of symmetry could be drawn through the "middle" of any figure. The student who selects this response may not understand how to recognize a line of symmetry for a two-dimensional figure.

Answer Choice B: This response may reflect an error in counting the number of lines of symmetry in a figure, as the figure appears to have multiple lines of symmetry. The student may have recognized only one line of symmetry or may have recognized multiple lines of symmetry and disregarded the requirement for exactly one line of symmetry. The student who selects this response may not understand how to identify a figure with exactly one line of symmetry.

Answer Choice C: This response correctly identifies a figure with exactly one line of symmetry. The student may have recognized that there was only one way this shape could be folded to have matching sides. The student who selects this response understands how to recognize exactly one line of symmetry for a two-dimensional figure as a line across the figure where the figure can be folded along the line into matching parts.

Answer Choice D: This response may reflect an error in identifying a line of symmetry. The student may have thought that a line could be drawn where this figure could be folded into matching parts or that a line of symmetry could be drawn through the "middle" of any figure. The student who selects this response may not understand how to recognize a line of symmetry for a two-dimensional figure.

Answer choices A, B, and D are plausible but incorrect. They represent common student errors made when recognizing a line of symmetry for a two-dimensional figure as a line across the figure where the figure can be folded along the line into matching parts.

What is the measurement of the angle below?
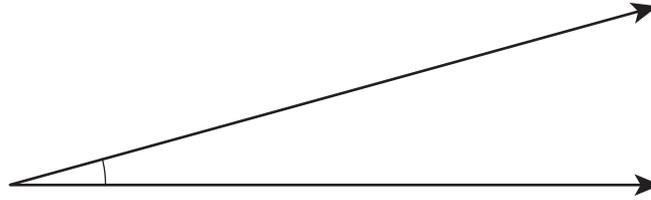
A 15°

B 25°

C 165°

D 175°

Key: A
Measured CCLS: 4.MD.6

Commentary: This question measures 4.MD.6 by asking the student to measure an angle in whole-number degrees using a protractor.

Extended Rationale

Answer Choice A: "15°"; This is the correct response that shows the number of degrees of the angle. The student may have understood how to correctly place the protractor on the angle to get an accurate reading of the angle measure. The student who selects this response understands how to measure an angle in whole-number degrees using a protractor.

Answer Choice B: : "25°"; This response may reflect a lack of understanding of how to use a protractor. The student may have lined up the protractor at the 10 degree mark instead of the 0°. The student who selects this response may not understand how to measure an angle in whole-number degrees using a protractor.
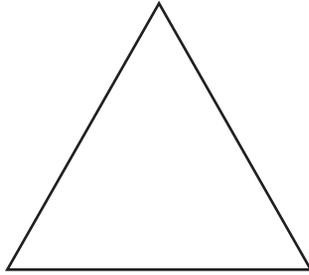
Answer Choice C: "165°"; This response may reflect a lack of understanding of measuring angles. The student may have read the supplement of the angle instead of the actual angle. The student who selects this response may not understand how to measure an angle in whole-number degrees using a protractor.

Answer Choice D: "175°"; This response may reflect a lack of understanding of how to use a protractor. The student may have attempted to read the supplement of the angle instead of the actual angle and misinterpreted a measurement five degrees from 170° as 175°, instead of 165°. The student who selects this response may not understand how to measure an angle using a protractor.
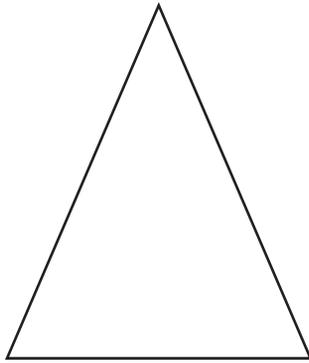
Answer choices B, C, and D are plausible but incorrect. They represent common student errors made when measuring an angle in whole-number degrees using a protractor.

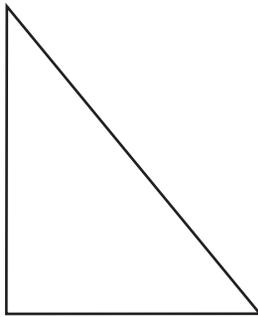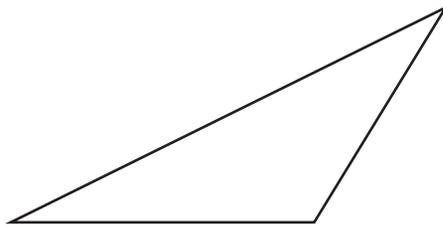Which figure appears to be a right triangle?

A

B

C

D

Key: C
Measured CCLS: 4.G.2

Commentary: This question measures 4.G.2 by asking the student to identify a right triangle.

Extended Rationale

Answer Choice A: This response may reflect a lack of understanding of how to classify triangles. The student may have mistaken the attributes of an equilateral triangle for those of a right triangle. The student who selects this response may not understand how to classify triangles and identify a right triangle.

Answer Choice B: This response may reflect a lack of understanding of how to classify triangles. The student may have mistaken the attributes of an isosceles triangle for those of a right triangle. The student who selects this response may not understand how to classify triangles and identify a right triangle.

Answer Choice C: This is the correct response that shows a right triangle. The student may have understood that a right triangle must have one right angle. The student who selects this response understands how to identify right triangles.

Answer Choice D: This response may reflect a lack of understanding of how to classify triangles. The student may have mistaken the attributes of an obtuse scalene triangle for those of a right triangle. The student who selects this response may not understand how to classify triangles and identify a right triangle.
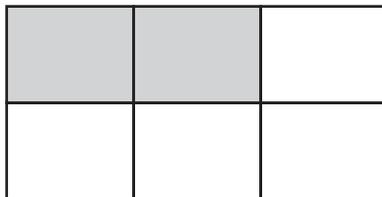
Answer choices A, B, and D are plausible but incorrect. They represent common student errors made when classifying triangles and identifying right triangles.

The model below is shaded to represent a fraction.

Which fraction is equivalent to the one represented by the model?

A $\frac{1}{6}$

B $\frac{1}{3}$

C $\frac{2}{4}$

D $\frac{2}{3}$

Key: B
Measured CCLS: 4.NF.1

Commentary: This question measures 4.NF.1 by asking the student to apply understanding that a fraction *a* / *b* is equivalent to a fraction (*n* × *a*) / (*n* × *b*) by using visual fraction models. The student must determine a fraction that is equivalent to the fraction shown in the model, $\frac{2}{6}$.

Extended Rationale

Answer Choice A: "$\frac{1}{6}$"; This response may reflect a lack of understanding of how to generate an equivalent fraction. The student may have only divided the numerator by 2 instead of dividing both the numerator and denominator by 2. The student who selects this response may not understand how to generate equivalent fractions using the fact that *a* / *b* is equivalent to a fraction (*n* × *a*) / (*n* × *b*).

Answer Choice B: "$\frac{1}{3}$"; This is the correct fraction that is equivalent to $\frac{2}{6}$. The student may have understood that a fraction can be multiplied by 1 (*n* / *n*) to determine an equivalent fraction. The student who selects this response may understand how to generate equivalent fractions using the fact that *a* / *b* is equivalent to a fraction (*n* × *a*) / (*n* × *b*).
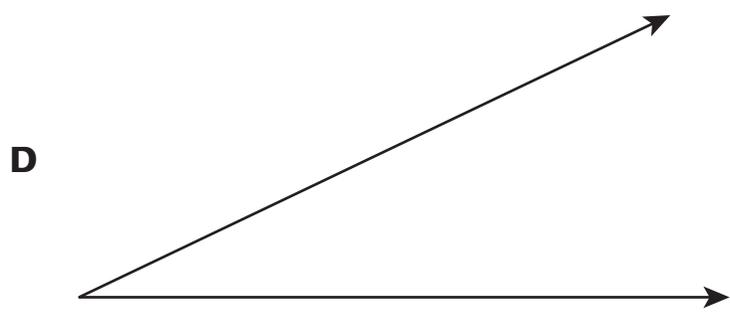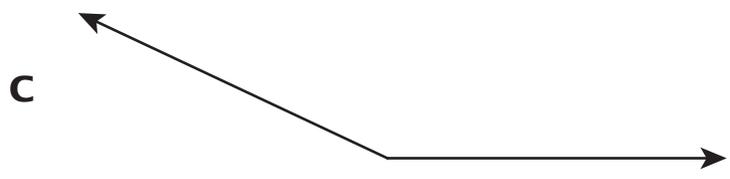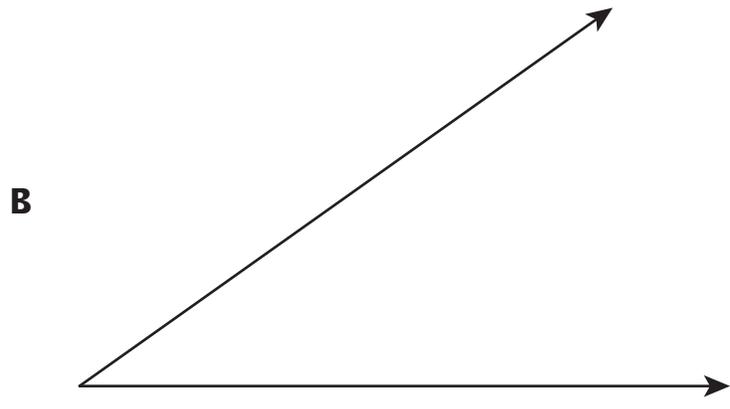
Answer Choice C: "$\frac{2}{4}$"; This response may reflect a lack of understanding of how to interpret a visual model of a fraction. The student may have seen that in the model, 2 parts are shaded and 4 parts are unshaded, so thought the fraction modeled was $\frac{2}{4}$. The student did not find an equivalent fraction. The student who selects

this response may not understand how to interpret fractions or how to use the rule *a* / *b* is equivalent to a fraction ($n \times a$) / ($n \times b$) by using visual fraction models.

Answer Choice D: "$\frac{2}{3}$"; This response may reflect an error in understanding how to interpret a visual model of a fraction. The student may have only considered the top row of the model and determined the fraction to be $\frac{2}{3}$. The student did not try to find a fraction equivalent to $\frac{2}{3}$. The student who selects this response may not understand how to interpret a visual fraction model or how to use the rule *a* / *b* is equivalent to a fraction ($n \times a$) / ($n \times b$).

Answer choices A, C, and D are plausible but incorrect. They represent common student errors made when using the rule *a* / *b* is equivalent to a fraction ($n \times a$) / ($n \times b$).
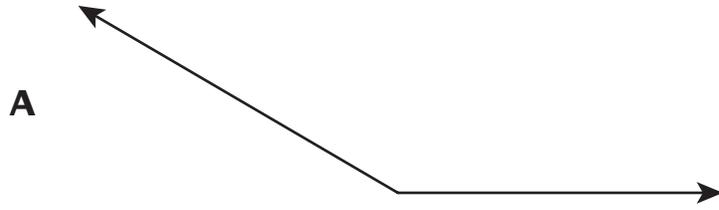
Which angle measures 25°?

A

B

C

D

Key: D
Measured CCLS: 4.MD.6

Commentary: This question measures 4.MD.6 by asking the student to measure angles in whole-number degrees using a protractor.

Extended Rationale

Answer Choice A: This response may reflect an error in measuring with the protractor. The student may have incorrectly measured an angle that is about 25 degrees less than 180 degrees as 25 degrees. The student who selects this response may not understand how to measure angles in whole-number degrees using a protractor.

Answer Choice B: This response may reflect an error in measuring with the protractor. The student may have aligned the protractor on the angle incorrectly. The student who selects this response may not understand how to measure angles in whole-number degrees using a protractor.

Answer Choice C: This response may reflect an error in measuring with the protractor. The student may have incorrectly measured an angle that is about 25 degrees less than 180 degrees as 25 degrees. The student who selects this response may not understand how to measure angles in whole-number degrees using a protractor.

Answer Choice D: This is the correct response that shows an angle that measures 25 degrees. The student may have aligned the protractor correctly on the angle and read the measurement correctly. The student who selects this response understands how to measure angles in whole-number degrees using a protractor.

Answer choices A, B, and C are plausible but incorrect. They represent common student errors made when measuring angles in whole-number degrees using a protractor.

4 thousands + 3 tens + 5 hundreds is less than which number below?

A 4 thousands + 5 tens + 3 hundreds

B 8 hundreds + 3 thousands + 8 ones

C 4 thousands + 7 ones + 8 tens + 6 hundreds

D 9 hundreds + 9 tens + 2 thousands

Key: C
Measured CCLS: 4.NBT.2

Commentary: This question measures 4.NBT.2 because the student is asked to read multi-digit whole numbers using base-ten numerals, number names, and expanded form; additionally, the student is asked to compare multi-digit whole numbers.

Extended Rationale

Answer Choice A: "4 thousands + 5 tens + 3 hundreds"; This response may reflect an error in organizing numbers by place value. The student may have made assumptions about the digits based on the order that they were given, interpreting given the value as 4,350 and the value in the answer choice as 4,530 and concluding that 4,350 < 4,530. The student who selects this response may not understand how to read multi-digit whole numbers using base-ten numerals, number names, and expanded form.

Answer Choice B: "8 hundreds + 3 thousands + 8 ones"; This response may reflect an error in organizing numbers by place value. The student may have looked only at the digits and assumed they were in the same place value order as the original expression, incorrectly interpreting this choice as 8,830 and concluding that 4,530 < 8,830. The student who selects this response may not understand how to read multi-digit whole numbers using base-ten numerals, number names, and expanded form.

Written in standard from, this choice is: 8,380.

Answer Choice C: "4 thousands + 7 ones + 8 tens + 6 hundreds"; This response represents the correct number that is less than 4,687. The student may have reordered the expressions by place value to compare the numbers. The student who selects this response understands how to read multi-digit numbers in expanded form and how to compare them.

Answer Choice D: "9 hundreds + 9 tens + 2 thousands"; This response may reflect an error in organizing numbers by place value. The student may have looked only at the digits and assumed they were in the same place value order as the original expression, incorrectly interpreting this choice as 9,290 and concluding that 4,530 < 9,290. The student who selects this response may not understand how to read multi-digit whole numbers using expanded form.
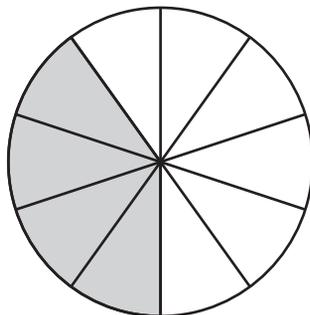
Answer choices A, B, and D are plausible but incorrect. They represent common student errors made when reading multi-digit whole numbers using expanded form.

The figure below is divided into equal sections.

Which expression represents the fraction of the figure that is shaded?

A $\frac{1}{10} + \frac{2}{10} + \frac{3}{10}$

B $\frac{1}{10} + \frac{1}{10} + \frac{2}{10}$

C $\frac{3}{10} + \frac{3}{10} + \frac{4}{10}$

D $\frac{4}{10} + \frac{4}{10} + \frac{4}{10}$

Key: B
Measured CCLS: 4.NF.3.b

Commentary: This question measures 4.NF.3.b by asking the student to decompose a fraction into a sum of fractions with the same denominator.

Extended Rationale

Answer Choice A: "$\frac{1}{10} + \frac{2}{10} + \frac{3}{10}$"; This response may reflect an error in understanding which part of the visual model represents the fraction. The student may have found the fraction that represents the unshaded part of the circle and decomposed it into three fractions with a sum of $\frac{6}{10}$. The student who selects this response may not understand how to determine which part of the model represents the fraction.

Answer Choice B: "$\frac{1}{10} + \frac{1}{10} + \frac{2}{10}$"; This is the correct response that shows that $\frac{4}{10}$ can be decomposed into $\frac{1}{10} + \frac{1}{10} + \frac{2}{10}$. The student may have understood that $\frac{4}{10}$ can be decomposed into several fractions that have a total sum of $\frac{4}{10}$. The student who selects this response understands how to decompose a fraction into a sum of fractions with the same denominator.

Answer Choice C: "$\frac{3}{10} + \frac{3}{10} + \frac{4}{10}$"; This response may reflect an error in using the model to determine the represented fraction. The student may have thought the model represented $\frac{10}{10}$ so decomposed $\frac{10}{10}$ into

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fractions that have a total sum of $\frac{10}{10}$. The student who selects this response may not understand how to use the model to identify a fraction.

Answer Choice D: "$\frac{4}{10} + \frac{4}{10} + \frac{4}{10}$"; This response may reflect a lack of understanding of how to decompose a fraction. The student may have correctly identified the fraction represented in the model but did not understand how to decompose $\frac{4}{10}$, so repeated $\frac{4}{10}$. The student who selects this response may not understand how to decompose a fraction into a sum of fractions with the same denominator.

Answer choices A, C, and D are plausible but incorrect. They represent common student errors made when decomposing a fraction into a sum of fractions with the same denominator.

What is $8\frac{3}{5} + 8\frac{1}{5}$?

A $8\frac{4}{10}$

B $8\frac{4}{5}$

C $16\frac{4}{10}$

D $16\frac{4}{5}$

Key: D
Measured CCLS: 4.NF.3.c

Commentary: This question measures 4.NF.3.c by asking the student to add mixed numbers with like denominators.

Extended Rationale

Answer Choice A: "$8\frac{4}{10}$"; This response reflects a lack of understanding of adding fractions and adding mixed numbers. The student may have added the fractions incorrectly by adding the numerators and denominators, $\frac{3+1}{5+5} = \frac{4}{10}$, without also adding the whole numbers. The student who selects this response may not understand how to add fractions or mixed numbers.

Answer Choice B: "$8\frac{4}{5}$"; This response reflects a lack of understanding of adding mixed numbers. The student may have understood how to add the fractions $\frac{3}{5}$ and $\frac{1}{5}$ but did not understand that the whole numbers needed to be added as well. The student who selects this response may not understand how to add mixed numbers.

Answer Choice C: "$16\frac{4}{10}$"; This response may reflect a lack of understanding of adding fractions. The student may have correctly added the whole numbers 8 and 8 to get 16, but incorrectly added the fractions by adding the numerators and denominators, $\frac{3+1}{5+5} = \frac{4}{10}$, The student who selects this response may not understand how to add fractions.

Answer Choice D: "$16\frac{4}{5}$"; This is the correct result when $8\frac{1}{5}$ is added to $8\frac{3}{5}$. The student may have calculated $\frac{1}{5} + \frac{3}{5} = \frac{4}{5}$ and 8 + 8 = 16. The student who selects this response understands how to add mixed numbers.

Answer choices A, B, and C are plausible but incorrect. They represent common student errors made when adding mixed numbers with like denominators.

Which number has a 5 that represents a value ten times greater than the value represented by the 5 in 41,253?

A 31,254

B 41,523

C 43,125

D 51,324

Key: B
Measured CCLS: 4.NBT.1

Commentary: This question measures 4.NBT.1 by asking the student to recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.

Extended Rationale

Answer Choice A: "31,254"; This response may reflect a lack of understanding of how to use place value to compare the values of digits. The student may have thought that 31,254 would be an acceptable response, because the digit 5 in this number is equal in value to the digit 5 in 41,523. The student who selects this response may not know how to find a number where the value of the digit 5 is ten times greater than the value of the digit 5 in the number 41,253.

Answer Choice B: "41,523"; This is the correct response that shows a number with a digit 5 that has a value ten times greater than the value of the digit 5 in the number 41, 253. The student may understand that the value of the digit 5 in the number 41,253 is 50, that the value of the digit 5 in the number 41,523 is 500, and that 500 is ten times as great as 50. The student who selects this response recognizes that in a multi-digit whole number, a digit in one place represents ten times the value it represents in the place to its right.

Answer Choice C: "43,125"; This response may reflect a lack of understanding of place value. The student may have incorrectly assumed that in a multi-digit number, a digit in one place represents ten times what it represents in the place to its left. The student may not have understood how to find a number with a digit 5 that is ten times greater than the value of the digit 5 in 41,253.

Answer Choice D: "51,324"; This response may reflect a lack of understanding of place value. The student may not have understood that the value of the digit 5 in the number 51,324 is 50,000 and the value of the digit 5 in the number 41,253 is 50. The student who selects this response may not understand that in a multi-digit whole number, a digit in one place represents ten times the value it represents in the place to its right.

Answer choices A, C, and D are plausible but incorrect. They represent common student errors made when trying to recognize that in a multi-digit whole number, a digit in one place represents ten times the value it represents in the place to its right.

Which fraction below can be placed in the box to make the statement true?

$$\square > \frac{3}{4}$$

A $\frac{2}{6}$

B $\frac{5}{12}$

C $\frac{1}{2}$

D $\frac{5}{6}$

Key: D
Measured CCLS: 4.NF.2

Commentary: This question measures 4.NF.2 by asking the student to compare two fractions with different numerators and different denominators. In this case, the student must identify a fraction that is greater than the given fraction, $\frac{3}{4}$.

Extended Rationale

Answer Choice A: "$\frac{2}{6}$"; This response may reflect an error in comparing fractions, possibly as a result of incorrectly using the denominator to determine whether a fraction is greater or less than another. Specifically, the student may have decided that $\frac{2}{6} > \frac{3}{4}$ because 6 is a greater number than 4. The student who selects this response may not understand how to compare two fractions with different numerators and different denominators.

Answer Choice B: "$\frac{5}{12}$"; This response may reflect an error in comparing fractions, possibly as a result of incorrectly reasoning with the numerator and the denominator for comparison purposes. Specifically, the student may have decided that $\frac{5}{12} > \frac{3}{4}$ because 5 is greater than 3 and 12 is greater than 4. The student who selects this response may not understand how to compare two fractions with different numerators and different denominators.

Answer Choice C: "$\frac{1}{2}$"; This response may reflect an incomplete understanding of comparing fractions. The student may have decided that $\frac{1}{2} > \frac{3}{4}$ because halves are greater-sized parts than fourths by examining the denominators, without including the numerators in the comparison. The student who selects this response may not understand how to compare two fractions with different numerators and different denominators.

Answer Choice D: "$\frac{5}{6}$"; This represents the correct fraction that is greater than $\frac{3}{4}$. The student may have found a common denominator to compare the fractions or may have compared the fractions to benchmark fractions. The student who selects this response understands how to compare two fractions with different

numerators and different denominators by creating common denominators or numerators, or by comparing to a benchmark fraction.

$\frac{10}{12} > \frac{9}{12}$ or $\frac{5}{6}$ is closer to 1 than $\frac{3}{4}$.

Answer choices A, B, and C are plausible but incorrect. They represent common student errors made when comparing two fractions with different numerators and different denominators.

Which statement is represented by the equation below?

$$15 \times 5 = 75$$

A   The number 15 is 5 less than 75.

B   The number 15 is 5 times as many as 75.

C   The number 75 is 15 more than 5.

D   The number 75 is 5 times as many as 15.

Key: D
Measured CCLS: 4.OA.1

Commentary: This question measures 4.OA.1 because it asks the student to interpret a multiplication equation as a comparison. In this case, students must interpret the equation "$15 \times 5 = 75$" as a statement comparing 15 and 75.

Extended Rationale

Answer Choice A: "The number 15 is 5 less than 75." This response may reflect an error in interpreting multiplication equations. The student may have misinterpreted the equation and the statement, reasoning that 15 is, in fact, less than 75. The student who selects this response may not understand how to interpret a multiplication equation as a comparison.

Answer Choice B: "The number 15 is 5 times as many as 75." The response may reflect an error in interpreting multiplication equations. The student may have transposed the 75 and the 15 in the equation, incorrectly interpreting that 15 is 5 times as many as 75. The student who selects this response may not understand how to interpret a multiplication equation as a comparison.

Answer Choice C: "The number 75 is 15 more than 5." The response may reflect an error in interpreting multiplication equations. The student may have misinterpreted the equation and the statement, reasoning that 75 is, in fact, more than 5. The student who selects this response may not understand how to interpret a multiplication equation as a comparison.

Answer Choice D: "The number 75 is 5 times as many as 15." This response represents the correct interpretation of the equation $15 \times 5 = 75$. The student who selects this response understands how to interpret a multiplication equation as a comparison.

Answer choices A, B, and C are plausible but incorrect. They represent common student errors made when interpreting a multiplication equation as a comparison.

Alex bought 2 printer cartridges for $28 each and a printer for $85. He gave the cashier $150. How much change should Alex have received from the cashier?

A $9

B $11

C $19

D $37

Key: A
Measured CCLS: 4.OA.3

Commentary: This question measures 4.OA.3 because it asks the student to use the four operations to solve a multistep word problem, posed with whole numbers that has a whole-number answer.

Extended Rationale

Answer Choice A: "$9"; This response represents the correct amount of change that should be received. This can be calculated by finding the total price of the 2 printer cartridges and the printer, then subtracting that amount from $150. The student who selects this response understands how to use the four operations to solve a multistep word problem posed with whole numbers that has a whole-number answer.

$2 \times 28 + 85 = 141$

$150 - 141 = 9$

Answer Choice B: "$11"; This response may reflect an error in subtraction. The student may have calculated the total cost of the three items as $141, but then made an error when subtracting $141 from $150. The student who selects this response may not understand how to use the four operations to solve a multistep word problem posed with whole numbers that has a whole-number answer.

$2 \times 28 + 85 = 141$

$150 - 141 = 11$

Answer Choice C: "$19"; This response may reflect an error in multiplication or subtraction. The student may have calculated the total cost of the three items as $141 but made an error when subtracting the cost from $150. Or the student may have incorrectly calculated the total cost of the three items as $131 before subtracting from $150. The student who selects this response may not understand how to use the four operations to solve a multistep word problem posed with whole numbers that has a whole-number answer.

$2 \times 28 + 85 = 141$ $2 \times 28 + 85 = 131$

                    or

$150 - 141 = 19$ $150 - 131 = 19$

Answer Choice D: "$37"; This response may reflect an incorrect mathematical representation of the problem situation. The student may have only calculated the total cost of one printer cartridge and the printer before subtracting that total from $150. The student who selects this response may not understand how to use the four operations to solve a multistep word problem posed with whole numbers that has a whole-number answer.

28 + 85 = 113

150 – 113 = 37

Answer choices B, C, and D are plausible but incorrect. They represent common student errors made when using the four operations to solve a multistep word problem posed with whole numbers that has a whole-number answer.

An angle is formed when placing a book on a shelf, as shown below.
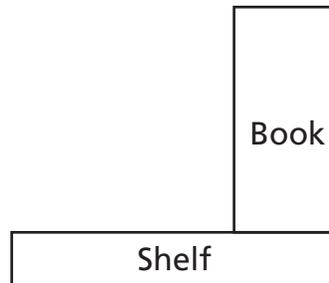
What is the measure of the angle formed by the book and the shelf?

A 45 degrees

B 90 degrees

C 180 degrees

D 360 degrees

Key: B
Measured CCLS: 4.MD.5.b

Commentary: This question measures 4.MD.5.b by asking the student to recognize that an angle that turns through n one-degree angles is said to have an angle measure of n degrees. Specifically, the student must recognize a 90 degree angle.

Extended Rationale

Answer Choice A: "45 degrees"; This response may reflect an error in recognizing the measure of an angle. The student may have thought the angle most closely resembled a 45 degree angle or chose the angle because he or she thought the angle was acute. The student may also have used the protractor incorrectly when measuring the angle. The student who selects this response may not understand how to recognize an angle measure of n degrees.

Answer Choice B: "90 degrees"; This is the correct number of degrees in the angle formed by the book and the shelf. The student may have recognized that the angle was formed by perpendicular lines or measured the angle with a protractor. The student who selects this response understands how to recognize an angle measure of n degrees.

Answer Choice C: "180 degrees"; This response may reflect an error in recognizing the measure of an angle. The student may have incorrectly identified a benchmark angle or may have measured the angle incorrectly. The student who selects this response may not understand how to recognize an angle measure of n degrees.

Answer Choice D: "360 degrees"; This response may reflect an error in recognizing the measure of an angle. The student may have incorrectly identified a benchmark angle or may have measured the angle incorrectly. The student who selects this response may not understand how to recognize an angle measure of n degrees.
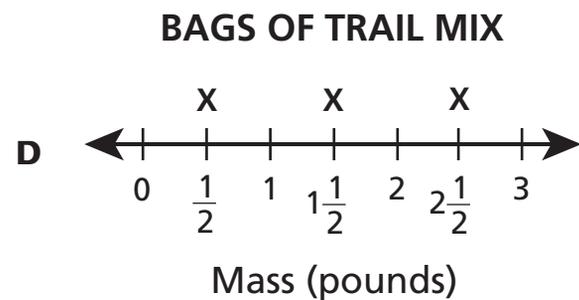
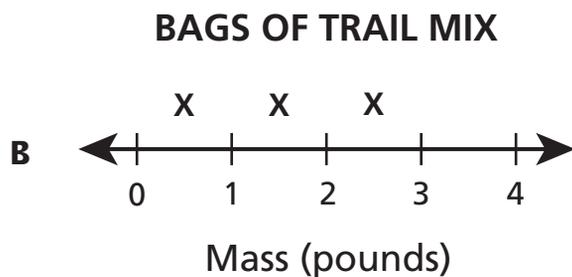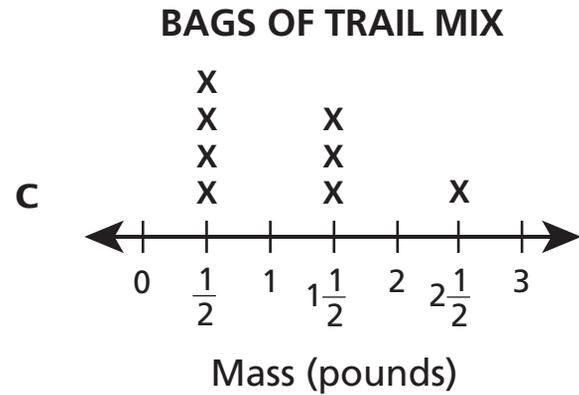Answer choices A, C, and D are plausible but incorrect. They represent common student errors made when recognizing that an angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees.

Ellen has several bags with different masses of trail mix, as shown in the table below.

BAGS OF TRAIL MIX

Mass of Bag (pounds)	Number of Bags
$2\frac{1}{2}$	1
$1\frac{1}{2}$	3
$\frac{1}{2}$	4

Which line plot represents the data in the table?

BAGS OF TRAIL MIX

A

Mass (pounds)

BAGS OF TRAIL MIX

C

Mass (pounds)

BAGS OF TRAIL MIX

B

Mass (pounds)

BAGS OF TRAIL MIX

D

Mass (pounds)

Key: C
Measured CCLS: 4.MD.4

Commentary: This question measures 4.MD.4 by asking the student to recognize a line plot that displays a data set of measurements in fractions of a unit.

Extended Rationale

Answer Choice A: This response may reflect an error in transferring the data from the table to the line plot. The student may have thought that the table showed the data in the order it should appear on the line plot. The student who selects this response may not understand how to recognize a line plot that displays a data set.

Answer Choice B: This response may reflect a lack of understanding of how to display data on a line plot. The student may not have understood that the line plot should have a clearly marked scale on the horizontal axis and that it must show the number of bags for each mass. The student who selects this response may not understand how to recognize a line plot that displays a data set of measurements in fractions of a unit.

Answer Choice C: This is the correct line plot for the data. The student may have understood that each X on the line plot stood for one bag of trail mix, so if the table shows 4 bags have a mass of $\frac{1}{2}$ pound, then there should be 4 Xs above the $\frac{1}{2}$ tick mark on the line plot. If the table shows 3 bags have a mass of $1\frac{1}{2}$ pounds, then there should be 3 Xs above the $1\frac{1}{2}$ tick mark on the line plot. If the table shows 1 bag has a mass of $2\frac{1}{2}$ pounds, then there should be 1 X above the $2\frac{1}{2}$ tick mark on the line plot. The student who selects this understands how to recognize a line plot that displays a data set of measurements in fractions of a unit.

Answer Choice D: This response may reflect a lack of understanding of how to display data on a line plot. The student may not have understood that the line plot must show the number of bags for each mass. The student who selects this response may not understand how to recognize a line plot that displays a data set of measurements in fractions of a unit.
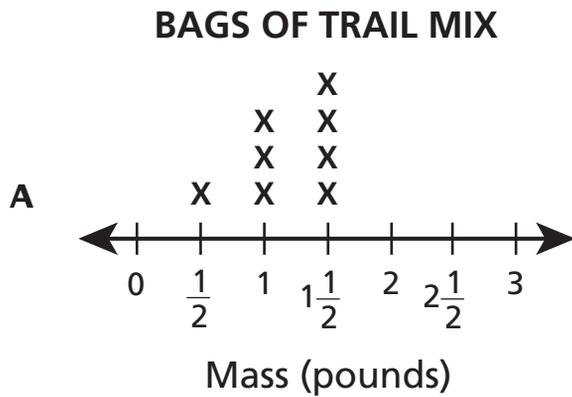
Answer choices A, B, and D are plausible but incorrect. They represent common student errors made when recognizing a line plot that displays a data set of measurements in fractions of a unit.

Maria, Leah, and Jonas ran these distances on Saturday:

- Maria ran $\frac{5}{6}$ mile.

- Leah ran $\frac{2}{3}$ mile.

- Jonas ran $\frac{3}{4}$ mile.

Who ran the shortest distance?

Show your work.

Answer _____

Measured CCLS: 4.NF.2

Commentary: This question measures 4.NF.2 because it assesses a student's ability to compare fractions with different numerators and denominators.

Extended Rationale: This question asks the student to determine which of three students ran the shortest distance, given fractions of a mile. The student must include a set of computations or visual models to explain and justify each step in the process. As indicated in the rubric, student responses will be rated on whether they show sufficient work to indicate a thorough understanding of comparing fractions with different numerators and denominators. The determining factor in demonstrating a thorough understanding is using mathematically sound procedures to lead to a correct response.

The correct answer is Leah.

Method 1: Student finds a common denominator for 6, 3, and 4, then compares the fractions by comparing numerators.

$$\frac{5}{6} = \frac{10}{12}$$

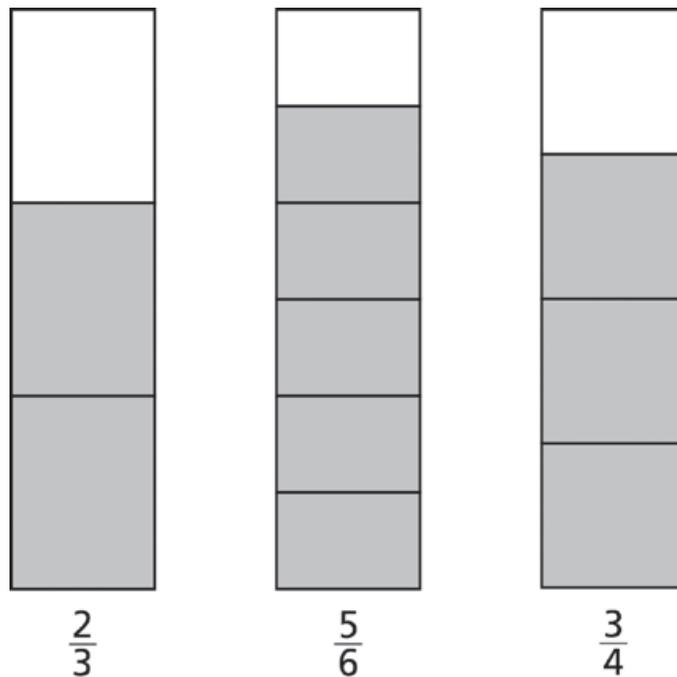$$\frac{2}{3} = \frac{8}{12}$$

$$\frac{3}{4} = \frac{9}{12}$$

The least fraction is $\frac{8}{12}$, which is the distance, in miles, Leah ran.

Method 2: Student may draw models showing equal-sized rectangles shaded to represent each fraction.

Student will show that a rectangle with $\frac{2}{3}$ of the parts shaded is less than both a rectangle with $\frac{5}{6}$ shaded or $\frac{3}{4}$ shaded.

Maria, Leah, and Jonas ran these distances on Saturday:

- Maria ran $\frac{5}{6}$ mile.

- Leah ran $\frac{2}{3}$ mile.

- Jonas ran $\frac{3}{4}$ mile.

Who ran the shortest distance?

Leah

Show your work.

$\frac{5}{6}$ $\frac{2}{3}$ $\frac{3}{4}$

$\frac{5 \times 2}{6 \times 2} = \frac{10}{12}$ $\frac{2 \times 4}{3 \times 4} = \boxed{\frac{8}{12}}$ $\frac{3 \times 3}{4 \times 3} = \frac{9}{12}$

shortest distance

6 : 6 (12) 24, 36
3 : 3, 6, 9 (12)
4 : 4, 8, (12) 16

12 = common denominator

Answer ___Leah___
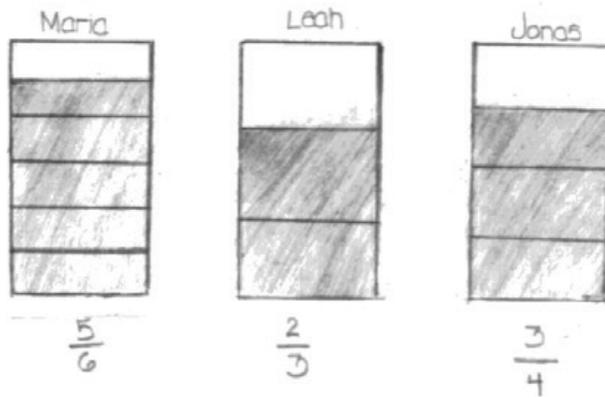

Score Point 2 (out of 2 points)

This response includes the correct solution (Leah) and demonstrates a thorough understanding of the mathematical concepts in the task. The shortest distance is determined by correctly converting the three fractions to equivalent fractions ($^{10}/_{12}$, $^{8}/_{12}$, $^{9}/_{12}$) with the least common denominator (12).

Maria, Leah, and Jonas ran these distances on Saturday:

- Maria ran $\frac{5}{6}$ mile.
- Leah ran $\frac{2}{3}$ mile.
- Jonas ran $\frac{3}{4}$ mile.

Who ran the shortest distance?

Show your work.

Maria   Leah   Jonas

$\frac{5}{6}$ $\frac{2}{3}$ $\frac{3}{4}$

Answer _____Leah_____

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 three fractions are correctly represented by comparable tape diagrams visually showing ⅔ as the smallest.
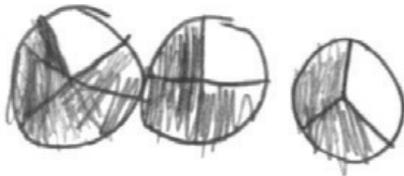
Maria, Leah, and Jonas ran these distances on Saturday:

- Maria ran $\frac{5}{6}$ mile.

- Leah ran $\frac{2}{3}$ mile.

- Jonas ran $\frac{3}{4}$ mile.

Who ran the shortest distance?

Show your work.

$$\frac{5}{6} \quad \frac{3}{4} \quad \frac{2}{3}$$

Answer ~~teah~~ Maria

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 (Maria) but applies a mathematically appropriate process. The three fractions are correctly represented as pie charts for comparison. However, the incorrect solution is the result of comparing the unshaded rather than the shaded parts of each chart, thereby identifying the longest distance instead of the shortest.

Maria, Leah, and Jonas ran these distances on Saturday:

- Maria ran $\frac{5}{6}$ mile. $= {}^{10}\!/_{12}$
- Leah ran $\frac{2}{3}$ mile. ${}^{8}\!/_{12}$
- Jonas ran $\frac{3}{4}$ mile. ${}^{9}\!/_{12}$

Who ran the shortest distance?

Show your work.

Maria ${}^{5}\!/_{6} \times 2 = {}^{10}\!/_{12}$

Leah ${}^{2}\!/_{3} \times 4 = {}^{8}\!/_{12}$ ← Shortest Distance

Jonas ${}^{3}\!/_{4} \times 3 = {}^{9}\!/_{12}$

Leah ran the shortest distance

Answer Leah ran the Shortest distance

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The three fractions are appropriately converted to equivalent fractions using the least common denominator (12) and the response contains a correct solution (Leah). However, instead of showing multiplication by 1, $^2\!/_2$ for example, the work incorrectly shows multiplication by a whole number other than 1 ($^5\!/_6 \times 2 = {}^{10}\!/_{12}$, $^2\!/_3 \times 4 = {}^8\!/_{12}$, $^3\!/_4 \times 3 = {}^9\!/_{12}$).

Maria, Leah, and Jonas ran these distances on Saturday:

- Maria ran $\frac{5}{6}$ mile.

- Leah ran $\frac{2}{3}$ mile.

- Jonas ran $\frac{3}{4}$ mile.

Who ran the shortest distance?

Show your work.

leah ran $\frac{2}{3}$ mile

She ran Shortist

distance

Answer _____
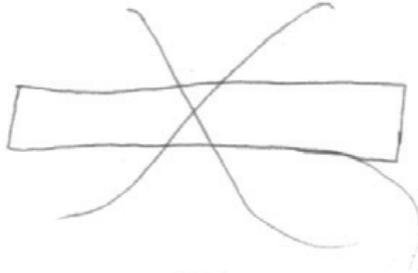

Score Point 0 (out of 2 points)

This response does not demonstrate even a limited understanding of the mathematical concepts embodied in the task. The response includes the correct solution; however, the required work is missing.

Maria, Leah, and Jonas ran these distances on Saturday:

- Maria ran $\frac{5}{6}$ mile.
- Leah ran $\frac{2}{3}$ mile.
- Jonas ran $\frac{3}{4}$ mile.

Who ran the shortest distance?

Show your work.

$$\frac{2}{3} \quad \frac{3}{4} \quad \frac{5}{6} \qquad \frac{2}{4} \quad \frac{3}{4} - \frac{5}{4} = \frac{0}{4}$$

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

Answer _____ Leah

Score Point 0 (out of 2 points)

This response does not demonstrate even a limited understanding of the mathematical concepts embodied in the task. This response contains a correct solution obtained using an obviously incorrect procedure. Each of the denominators is arbitrarily changed to 4 in order to compare the numerators.

Marta picked $\frac{4}{8}$ cup of blueberries. Her sister picked $\frac{3}{8}$ cup of blueberries. They used $\frac{6}{8}$ cup of all the blueberries they picked to make muffins. What was the amount, in cups, left of the blueberries they picked?

Show your work.

Answer _____ cup(s)

Commentary: This question measures 4.NF.3.d because it assesses a student's ability to solve a word problem involving addition and subtraction of fractions referring to the same whole and having like denominators. In addition, this question can be solved by using visual models or equations.

Extended Rationale: This question asks the student to find the amount, in cups, of blueberries that Marta and her sister have left after using some of the blueberries they picked to make muffins. The student must include a set of computations or visual models to explain and justify each step in the process. As indicated in the rubric, student responses will be rated on whether they show sufficient work to indicate a thorough understanding of adding and subtracting fractions referring to the same whole and having like denominators. The determining factor in demonstrating a thorough understanding is using mathematically sound procedures to lead to a correct response.

The correct amount, in cups, of blueberries left after Marta and her sister use some of the blueberries they picked to make muffins may be determined by using the following methods:

The problem may be solved by adding and then subtracting fractions:

Method 1:

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

$$\frac{7}{8} - \frac{6}{8} = \frac{1}{8}$$

The problem may also be solved using a visual model:

Method 2: Student may draw a model showing $\frac{4}{8} + \frac{3}{8} = \frac{7}{8}$ and a model showing $\frac{7}{8} - \frac{6}{8} = \frac{1}{8}$.

$$\frac{7}{8} \quad - \quad \frac{6}{8} \quad = \quad \frac{1}{8}$$
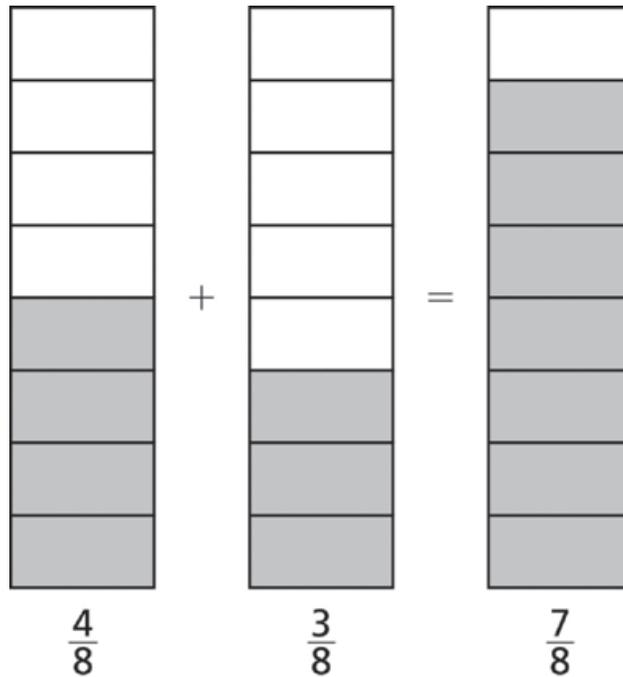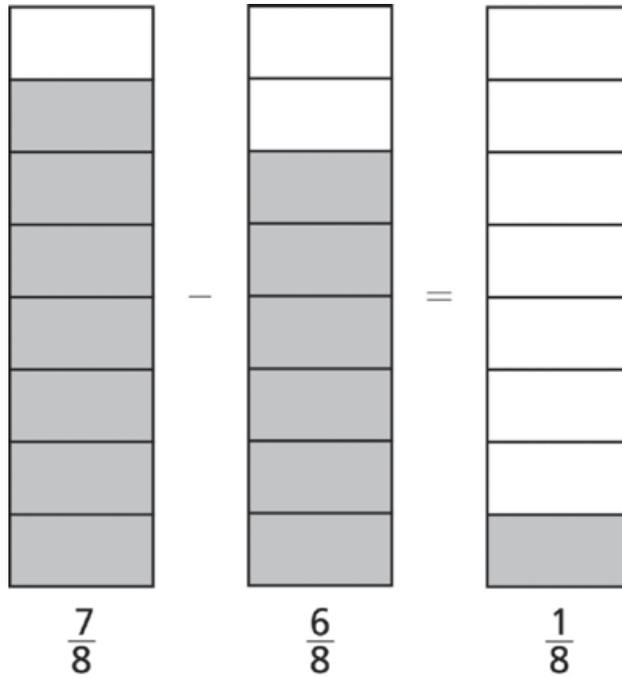
Finally, the problem may also be solved using an equation, with a symbol (such as the letter *n*) to represent the unknown:

Method 3:

$(\frac{4}{8} + \frac{3}{8}) - \frac{6}{8} = n$

$\frac{7}{8} - \frac{6}{8} = n$

$n = \frac{1}{8}$

Marta picked $\frac{4}{8}$ cup of blueberries. Her sister picked $\frac{3}{8}$ cup of blueberries.
They used $\frac{6}{8}$ cup of all the blueberries they picked to make muffins. What was
the amount, in cups, left of the blueberries they picked?

Show your work.

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

$$\frac{7}{8} - \frac{6}{8} = \frac{1}{8}$$

Answer _____ $\frac{1}{8}$ _____ cup(s)

Score Point 2 (out of 2 points)

This response includes the correct solution ($^1/_8$) and demonstrates a thorough understanding of the mathematical concepts in the task. The task is completed correctly, using mathematically sound procedures ($^4/_8 + {}^3/_8 = {}^7/_8$; $^7/_8 - {}^6/_8 = {}^1/_8$).

Marta picked $\frac{4}{8}$ cup of blueberries. Her sister picked $\frac{3}{8}$ cup of blueberries. They used $\frac{6}{8}$ cup of all the blueberries they picked to make muffins. What was the amount, in cups, left of the blueberries they picked?

Show your work.

$$\frac{7}{8}$$
$$-\frac{6}{8}$$
$$\frac{1}{8}$$

Answer ___1/8___ cup(s)

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 contains the correct process of subtracting the cups used from the cups picked ($\frac{7}{8}$ – $\frac{6}{8}$ = $\frac{1}{8}$). Not showing the addition to find the total amount of blueberries picked, $\frac{4}{8}$ + $\frac{3}{8}$, does not detract from the demonstration of a thorough understanding.

Marta picked $\frac{4}{8}$ cup of blueberries. Her sister picked $\frac{3}{8}$ cup of blueberries. They used $\frac{6}{8}$ cup of all the blueberries they picked to make muffins. What was the amount, in cups, left of the blueberries they picked?

Show your work.

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

$$\frac{7}{8} - \frac{1}{8} = \frac{6}{8}$$

Answer _____ $\frac{6}{8}$ _____ cup(s)

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 ($^6/_8$) but applies a mathematically appropriate process. The response correctly adds the cups picked ($^4/_8 + {}^3/_8 = {}^7/_8$) and subtracts the cups remaining from the cups picked ($^7/_8 - {}^1/_8 = {}^6/_8$); however, the response records the cups used ($^6/_8$) as the solution to the problem instead of the cups remaining ($^1/_8$).

Marta picked $\frac{4}{8}$ cup of blueberries. Her sister picked $\frac{3}{8}$ cup of blueberries. They used $\frac{6}{8}$ cup of all the blueberries they picked to make muffins. What was the amount, in cups, left of the blueberries they picked?

Show your work.

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

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

Answer _____ $\frac{7}{8}$ _____ cup(s)

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The response correctly addresses only some elements of the task. The cups picked are correctly added ($4/8 + 3/8 = 7/8$); however, the cups left are not determined and an incorrect solution is provided ($7/8$).

Marta picked $\frac{4}{8}$ cup of blueberries. Her sister picked $\frac{3}{8}$ cup of blueberries. They used $\frac{6}{8}$ cup of all the blueberries they picked to make muffins. What was the amount, in cups, left of the blueberries they picked?

Show your work.

$$\frac{4}{8} - \frac{3}{8} \left| \frac{1}{8} \right.$$

Answer $\frac{1}{8}$ cup(s)

Score Point 0 (out of 2 points)

This response does not demonstrate even a limited understanding of the mathematical concepts embodied in the task. The correct solution (¹⁄₈) is obtained using an incorrect procedure that subtracts, instead of adds, the amounts picked (⁴⁄₈ – ³⁄₈ = ¹⁄₈).

Marta picked $\frac{4}{8}$ cup of blueberries. Her sister picked $\frac{3}{8}$ cup of blueberries. They used $\frac{6}{8}$ cup of all the blueberries they picked to make muffins. What was the amount, in cups, left of the blueberries they picked?

Show your work.

$$\frac{8}{8} - \frac{6}{8} = \frac{2}{8}$$

Answer $\frac{2}{8}$ cup(s)

Score Point 0 (out of 2 points)

This response does not demonstrate even a limited understanding of the mathematical concepts embodied in the task. The calculations ($^8/_8 – ^6/_8 = ^2/_8$), while correct, are irrelevant to the question, and, as a result, the solution is incorrect.

Draw two lines that are perpendicular.

What type of angle is formed where the perpendicular lines intersect?

Answer _____

Measured CCLS: 4.G.1

Commentary: This question measures 4.G.1 because it assesses a student's ability to draw perpendicular lines and identify a right angle.

Extended Rationale: This question asks the student to draw two lines that are perpendicular and to identify the type of angle formed by perpendicular lines. As indicated in the rubric, student responses will be rated on whether they show a thorough understanding of drawing perpendicular lines and identifying a right angle. The determining factor in demonstrating a thorough understanding is using mathematically sound procedures to lead to a correct response.

The correct answer is a drawing of two lines that are perpendicular and an answer of "right angle" for the type of angle that the perpendicular lines create when they intersect.

Draw two lines that are perpendicular.

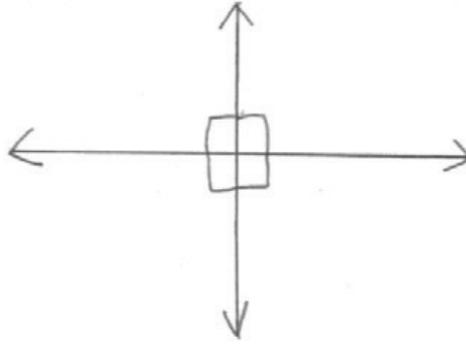**What type of angle is formed where the perpendicular lines intersect?**

90°
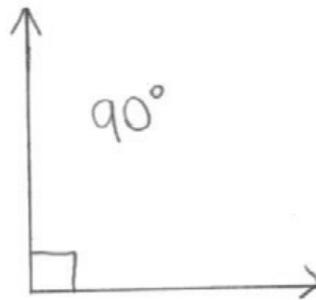
Answer right angle

Score Point 2 (out of 2 points)

This response includes correct solutions and demonstrates a thorough understanding of the mathematical concepts in the task. Two perpendicular lines are drawn, and the type of angle formed where these lines intersect is correctly identified (right angle).

Draw two lines that are perpendicular.

What type of angle is formed where the perpendicular lines intersect?
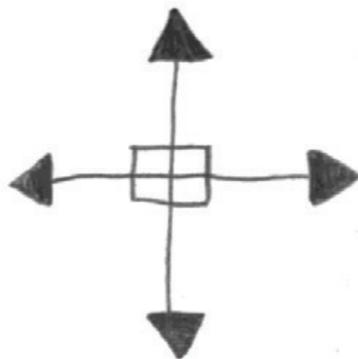

Answer rightangles

Score Point 2 (out of 2 points)

This response includes correct solutions and demonstrates a thorough understanding of the mathematical concepts in the task. Two perpendicular lines are drawn, and all angles formed where these lines intersect are correctly identified as right angles.

Draw two lines that are perpendicular.

What type of angle is formed where the perpendicular lines intersect?

Answer Obtuse

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. Two perpendicular line segments are drawn; however, the angle formed at the point the line segments intersect is incorrectly identified as obtuse. Providing line segments, rather than lines, does not detract from a thorough understanding.

Draw two lines that are perpendicular.

What type of angle is formed where the perpendicular lines intersect?

Answer _right angle_

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. Two parallel, rather than perpendicular, lines are drawn; however, the type of angle formed when two perpendicular lines intersect is correctly identified (right angle). A response that identifies the angle type as right or 90°, even if the lines provided do not reflect that solution, demonstrates a partial understanding.

Draw two lines that are perpendicular.

What type of angle is formed where the perpendicular lines intersect?
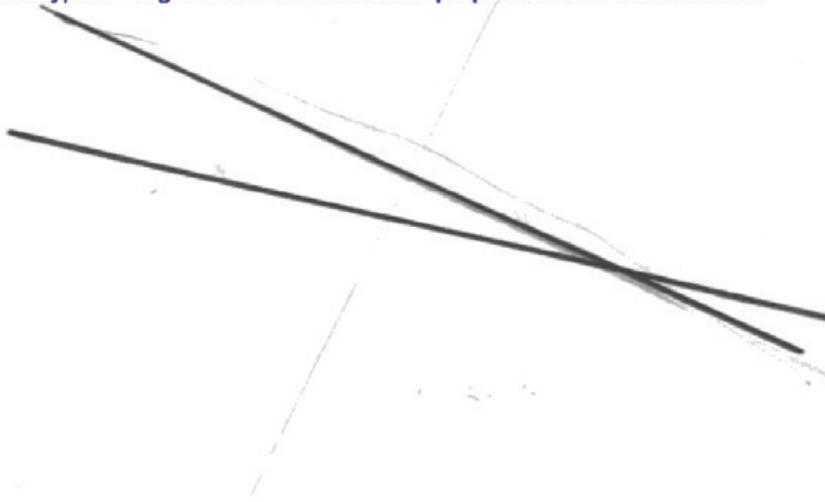
Answer acute

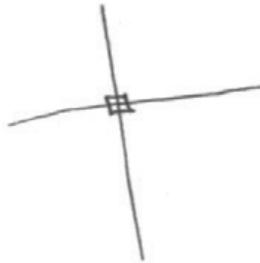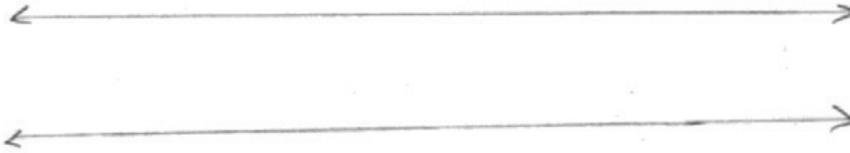### Score Point 0 (out of 2 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task. Parallel rather than perpendicular lines are drawn, and the type of angle formed when perpendicular lines intersect is incorrectly identified as acute.

Draw two lines that are perpendicular.
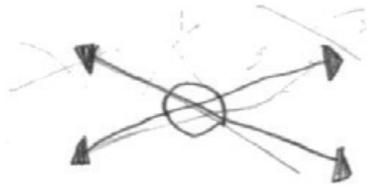
What type of angle is formed where the perpendicular lines intersect?
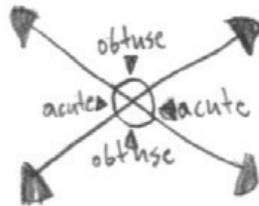
Answer They turn into intersecting lines

Score Point 0 (out of 2 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task. The intersecting lines provided are not perpendicular, and the correct angle type is not identified.

Ms. Carson's art class made a large rectangular mural. The length of the mural is 9 feet, and its area is 72 square feet.

What is the width of the mural?

Answer _____ feet

What is the perimeter of the mural?

Answer _____ feet

Measured CCLS: 4.MD.3

Commentary: This question measures 4.MD.3 because it assesses applying the area and perimeter formula for a rectangle in a real-world problem.

Extended Rationale: This question asks students to find the width of a rectangular mural, given its length and area, and then find the perimeter of the rectangular mural using the width found in the first part of the question and the given length.

To answer the first part of the question, the student must use the area formula, which states that the area of a rectangle is equal to the length times the width. The student could have used the known values for area (72 square feet) and length (9 feet), to result in either a division or unknown factor problem, to arrive at an answer of 8 feet:

$72 \div 9 = 8$

$9 \times ? = 72$

Performing the division operation or looking for the unknown factor results in an answer of 8 feet.

To answer the second part of the question, the student must use the length given in the problem and the width calculated in the first part to find the perimeter. The student must know that the perimeter of a rectangle can be calculated by adding together two widths and two lengths. A common approach to this is using a valid number sentence or equation, possibly aided by drawing a picture:
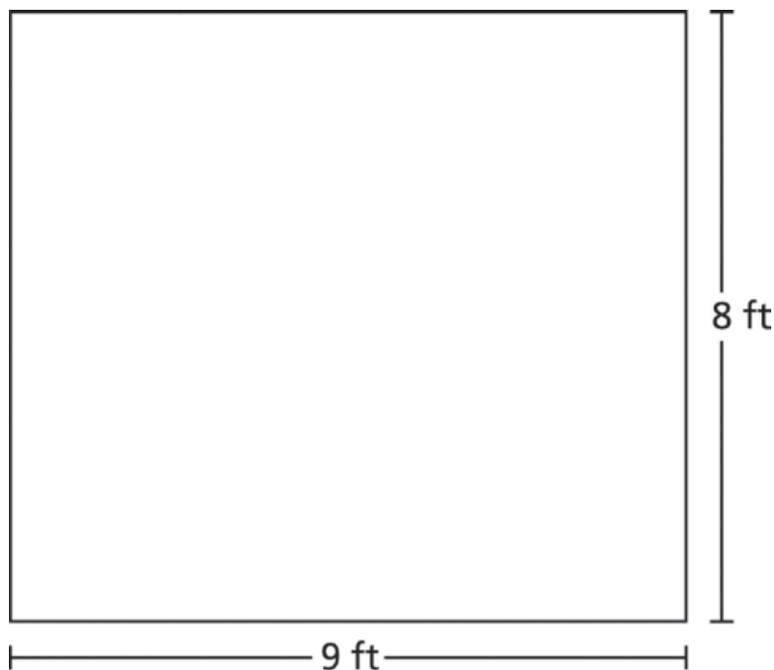
$9 + 9 + 8 + 8 = 34$

Or

$2 \times 9 = 18$

$2 \times 8 = 16$

$18 + 16 = 34$

Either adding the lengths of the sides of the rectangle or multiplying the length and width each by two, then adding, results in an answer of 34 feet.

Ms. Carson's art class made a large rectangular mural. The length of the mural is 9 feet, and its area is 72 square feet.

What is the width of the mural?

$72 \div 9 = 8$

Answer _____8_____ feet

What is the perimeter of the mural?

$9 + 8 = 17$

$17 \times 2 = 34$

Answer _____34_____ feet

Score Point 2 (out of 2 points)

This response includes the correct width (8), the correct perimeter (34), and demonstrates a thorough understanding of the mathematical concepts in the task. Since work is not required for this question, per scoring policy #11, any work shown will not be scored.

Ms. Carson's art class made a large rectangular mural. The length of the mural is 9 feet, and its area is 72 square feet.

What is the width of the mural?

Answer _____8_____ feet

What is the perimeter of the mural?

$$\begin{array}{r} 1 \\ 18 \\ +16 \\ \hline 34 \end{array}$$

Answer _____34_____ feet

Score Point 2 (out of 2 points)

This response includes the correct width (8), the correct perimeter (34), and demonstrates a thorough understanding of the mathematical concepts in the task. Since work is not required for this question, any work shown will not be scored (see scoring policy #11).

Ms. Carson's art class made a large rectangular mural. The length of the mural is 9 feet, and its area is 72 square feet.

What is the width of the mural?

$$72 \div 9 = 8$$

Answer ___8___ feet

What is the perimeter of the mural?

Answer ___72___ feet

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The response includes the correct solution for the width of the mural (8); however, the solution provided for the perimeter is incorrect (72). Since work is not required for this question, any work shown will not be scored (see scoring policy #11).

Ms. Carson's art class made a large rectangular mural. The length of the mural is 9 feet, and its area is 72 square feet.

What is the width of the mural?

27

9 [rectangle] 9

27

7 12
7̸2̸
−1 8
5 4

27
2)5 4
−4 4
−1 4

Answer 27 **feet**

What is the perimeter of the mural?

1
2̸7
+2 7
5 4

9
+ 9
1 8

1
5 4
+1 8
7 2

Answer 72 **feet**

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The solution provided for the width of the mural is incorrect (27); however, the solution provided for the perimeter (72) is correct based on that incorrect width. The second solution is dependent upon the first; therefore, if the width is 27, the correct perimeter is 72, 27 + 27 = 54, 9 + 9 = 18, and 54 + 18 = 72. Per scoring policy #11, any work shown is not assessed.

Ms. Carson's art class made a large rectangular mural. The length of the mural is 9 feet, and its area is 72 square feet.

What is the width of the mural?

72
×9
648

Answer _____648_____ feet

What is the perimeter of the mural?

72
+9 ÷2
81

Answer _____81_____ feet

Score Point 0 (out of 2 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task. The solutions provided are incorrect (648 and 81).

Ms. Carson's art class made a large rectangular mural. The length of the mural is 9 feet, and its area is 72 square feet.

What is the width of the mural?

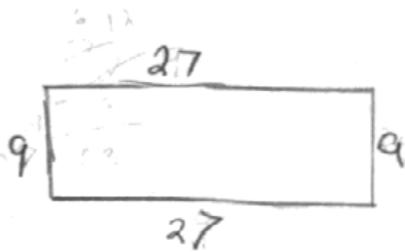**Answer** _____27_____ feet

What is the perimeter of the mural?
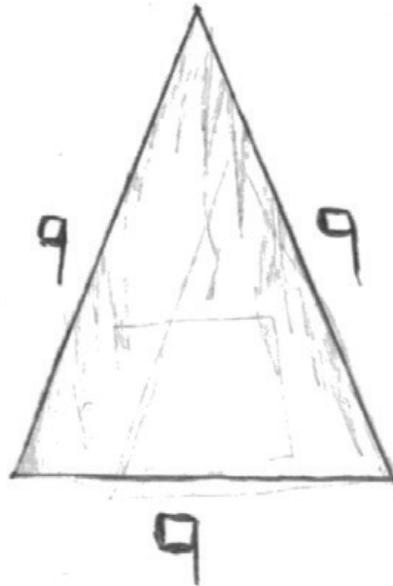
$9+9+9=27$

Answer _____27_____ feet

Score Point 0 (out of 2 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task. The solutions provided are incorrect (27 and 27).

00 Andrés is a baker. He baked 3,240 cookies in one week. He placed the cookies in boxes containing 9 cookies each. What was the total number of boxes Andrés used?

Show your work.

Answer _____ boxes

Measured CCLS: 4.NBT.6

Commentary: This question measures 4.NBT.6 because it assesses a student's ability to find a whole-number quotient with up to a four-digit dividend and a one-digit divisor.

Extended Rationale: This question asks students to find the total number of boxes needed for Andrés to put 3,240 cookies into boxes of 9 cookies each. Students must include a set of computations that will lead to a correct response, where work is provided to defend each step in the 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 with up to a four-digit dividend and a one-digit divisor. The determining factor in demonstrating a thorough understanding is using mathematically sound procedures to lead to a correct response.

The correct answer is 360 boxes.

One possible solution is to use division, recognizing that the number of boxes is equal to the total number of cookies, 3,240, divided by 9, the number of cookies in each box:

$3{,}240 \div 9 = 360$

Andrés is a baker. He baked 3,240 cookies in one week. He placed the cookies in boxes containing 9 cookies each. What was the total number of boxes Andrés used?

Show your work.

$$
\begin{array}{r}
0\ 360 \\
9\overline{)\ -3{,}240} \\
\underline{0}\downarrow \\
32 \\
\underline{-27}\downarrow \\
54 \\
\underline{-54} \\
08 \\
\underline{-0} \\
00
\end{array}
$$

Answer __360__ boxes

Score Point 2 (out of 2 points)

This response includes a correct solution (360) and demonstrates a thorough understanding of the mathematical concepts in the task. The task is completed correctly, using a mathematically sound procedure (3,240 ÷ 9 = 360).

Andrés is a baker. He baked 3,240 cookies in one week. He placed the cookies in boxes containing 9 cookies each. What was the total number of boxes Andrés used?

Show your work. (360)

```
        360
   9) 3,240          9=
       900    |100
      2,340
       900    |100
       1,440
       900    |100
       4540
       450    |50
        090
         90   |10
         00
```

Answer _____360_____ boxes

Score Point 2 (out of 2 points)

This response includes a correct solution (360) and demonstrates a thorough understanding of the mathematical concepts in the task. A mathematically sound procedure of division using partial quotients is applied to determine the total number of boxes used. Note that this process involves multiplying the divisor (9) by a factor (in this case 100, 50, or 10), and then subtracting the product from the dividend (3,240). After the dividend (3,240) has been reduced to 0 using this method, the factors (100, 100, 100, 50, and 10) are added to derive the quotient.

Andrés is a baker. He baked 3,240 cookies in one week. He placed the cookies in boxes containing 9 cookies each. What was the total number of boxes Andrés used?

Show your work.

Answer __371 R1__ boxes

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. A mathematically appropriate process is applied to the task (3,240 ÷ 9); however, a minor calculation error (32 – 27 = 6) results in an incorrect solution (371 r1).

Andrés is a baker. He baked 3,240 cookies in one week. He placed the cookies in boxes containing 9 cookies each. What was the total number of boxes Andrés used?

Show your work.

$$
\begin{array}{r}
260 \\
9\overline{)3{,}240} \\
\underline{27} \\
54 \\
\underline{54} \\
00 \\
\underline{-0} \\
0
\end{array}
$$

$$
\begin{array}{r}
\overset{5}{260} \\
\times\ 9 \\
\hline
3{,}240
\end{array}
$$

Answer __2,60__ boxes

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. A mathematically appropriate process is applied to the task (3,240 ÷ 9); however, a minor calculation error (2 × 9 = 27) results in an incorrect solution (260).

Andrés is a baker. He baked 3,240 cookies in one week. He placed the cookies in boxes containing 9 cookies each. What was the total number of boxes Andrés used?

Show your work.

$$\begin{array}{r} \overset{2}{}\overset{3}{} \\ 3,240 \\ \times 9 \\ \hline 29,160 \end{array}$$

Answer _29,160_ boxes

Score Point 0 (out of 2 points)

This response does not demonstrate even a limited understanding of the mathematical concepts embodied in the task. The calculation (3,240 × 9 = 29,160), while correct, is irrelevant to the question.

Andrés is a baker. He baked 3,240 cookies in one week. He placed the cookies in boxes containing 9 cookies each. What was the total number of boxes Andrés used?

Show your work.

$$
\begin{array}{r}
3{,}240 \\
+\ 9 \\
\hline
3{,}249
\end{array}
$$

Answer _3,249_ boxes

Score Point 0 (out of 2 points)

This response does not demonstrate even a limited understanding of the mathematical concepts embodied in the task. The calculation (3,240 + 9 = 3,249), while correct, is irrelevant to the question.

A grocery store had cans of soup on 7 different shelves. The bottom 4 shelves each had 29 cans. The top 3 shelves each had 42 cans. What was the total number of cans on the shelves?

Show your work.

Answer _____ cans of soup

After 56 cans of soup were sold, a clerk moved the remaining cans to a display case. The display case had shelves that could each hold 9 cans. How many shelves were needed to fit all the remaining cans?

Answer _____ shelves

Measured CCLS: 4.OA.3

Commentary: This question measures 4.OA.3 because it assesses the student's ability to solve a multi-step word problem posed with whole numbers and having a whole-number answer using the four operations, including problems in which remainders must be interpreted.

Extended Rationale: This question asks students to find the total number of soup cans on 7 shelves given 4 shelves with 29 cans each and 3 shelves with 42 cans each. Then the question asks the students to find the number of shelves needed to display 9 cans each after 56 cans were sold. Students must include a set of computations that will lead to a correct response, where work is provided to defend each step in the 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 multi-step word problem posed with whole numbers and having a whole-number answer using the four operations, including problems in which remainders must be interpreted. The determining factor in demonstrating a thorough understanding is using mathematically sound procedures to lead to a correct response.

The correct answers are 242 cans of soup and 21 shelves.

One possible solution involves multiplying the number of bottom shelves, 4, times the number of cans on each bottom shelf, 29. This product is then added to the number of top shelves, 3, times the number of cans in each top shelf, 42:

Method 1:

$4 \times 29 = 116$

$3 \times 42 = 126$

$116 + 126 = 242$

In order to determine the number of shelves required to fit the remaining cans, the student could have subtracted 56 and then divided by 9:

$242 - 56 = 186$

$186 = 9 \times 20 + 6$

The problem requires then that the student correctly interpret the remainder, which is 6. In this context, the remainder indicates that an entire extra shelf will be needed, leading to an answer of 21 shelves.

A grocery store had cans of soup on 7 different shelves. The bottom 4 shelves each had 29 cans. The top 3 shelves each had 42 cans. What was the total number of cans on the shelves?

Show your work.

$$\begin{array}{r} 4 \text{ bottom shelves} \\ \times\ ^3_2 9 \text{ cans per shelve} \\ \hline 116 \text{ cans on 4 bottom shelves} \end{array}$$

$$\begin{array}{r} * \quad 42 \text{ cans per shelve} \\ 3 \text{ top shelves} \\ \hline 126 \text{ cans on 3 tops} \end{array}$$

$$\begin{array}{r} 116 \text{ cans on 4 6} \\ +\ 126 \text{ cans on 3 top} \\ \hline 242 \end{array}$$

Answer ____242____ cans of soup

After 56 cans of soup were sold, a clerk moved the remaining cans to a display case. The display case had shelves that could each hold 9 cans. How many shelves were needed to fit all the remaining cans?

$$\begin{array}{r} 242 \text{ cans in all} \\ -\quad 56 \text{ sold} \\ \hline 186 \text{ cans left} \end{array}$$

$$\begin{array}{r} x20\frac{6}{9} \\ 9)\overline{186} \\ 18 \\ \hline 06 \\ 0 \\ \hline 6 \end{array}$$

$$20\frac{6}{9} \sim 21$$

Answer ____21____ shelves

Score Point 3 (out of 3 points)

This response includes the correct solutions (242, 21) and demonstrates a thorough understanding of the mathematical concepts in the task. The response uses mathematically sound procedures to determine the solution to the first part ($4 \times 29 = 116$, $42 \times 3 = 126$, and $116 + 126 = 242$). The second part does not require work; per scoring policy #11, any work shown for the second part will not be assessed.

A grocery store had cans of soup on 7 different shelves. The bottom 4 shelves each had 29 cans. The top 3 shelves each had 42 cans. What was the total number of cans on the shelves?

Show your work.

$$\begin{array}{r} 4 \\ 29 \\ 29 \\ 29 \\ 29 \\ 29 \\ 42 \\ 42 \\ +42 \\ \hline 242 \end{array}$$

$$\begin{array}{r} 1 \\ 126 \\ +116 \\ \hline 142 \end{array}$$

$$\begin{array}{r} 3 \\ 29 \\ \times\ 4 \\ \hline 116 \end{array}$$

$$\begin{array}{r} 42 \\ \times\ 3 \\ \hline 126 \end{array}$$

Answer _____240_____ cans of soup

After 56 cans of soup were sold, a clerk moved the remaining cans to a display case. The display case had shelves that could each hold 9 cans. How many shelves were needed to fit all the remaining cans?

$$\begin{array}{r} 1\ 13\ 10 \\ \cancel{240} \\ -\ 56 \\ \hline 184 \end{array}$$

$$\begin{array}{r} 20 \\ +1 \\ \hline 21 \end{array}$$

$$9\overline{)184}\ r4$$

Answer _____21_____ shelves

Score Point 3 (out of 3 points)

This response includes the correct solutions (242, 21) and demonstrates a thorough understanding of the mathematical concepts in the task. The response uses mathematically sound procedures to determine the solution to the first part (29 + 29 + 29 + 29 + 42 + 42 + 42 = 242). A transcription error from the work area to the answer line results in an incorrect solution recorded (240); however, this minor transcription error does not detract from a demonstration of thorough understanding.

A grocery store had cans of soup on 7 different shelves. The bottom 4 shelves each had 29 cans. The top 3 shelves each had 42 cans. What was the total number of cans on the shelves?

Show your work.

$$\begin{array}{r} 4\overset{2}{2} \\ \times 3 \\ \hline 126 \end{array}$$

$$\begin{array}{r} \overset{3}{2}9 \\ \times 4 \\ \hline 116 \end{array}$$

$$\begin{array}{r} 1 \\ 126 \\ +116 \\ \hline 242 \end{array}$$

Answer ___242___ cans of soup

After 56 cans of soup were sold, a clerk moved the remaining cans to a display case. The display case had shelves that could each hold 9 cans. How many shelves were needed to fit all the remaining cans?

$$\begin{array}{r} 6 \; R2 \\ 9\overline{)56} \\ -54 \\ \hline 2 \end{array}$$

Answer ___7___ shelves

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The response uses mathematically sound procedures to correctly determine the solution (242) to the first part ($3 \times 42 = 126$, $4 \times 29 = 116$, and $116 + 126 = 242$); however, the solution to the second part is incorrect (7).

A grocery store had cans of soup on 7 different shelves. The bottom 4 shelves each had 29 cans. The top 3 shelves each had 42 cans. What was the total number of cans on the shelves?

Show your work.

$$
\begin{array}{r}
^{2}\ 42 \\
\times\ 3 \\
\hline
126
\end{array}
$$

$$
\begin{array}{r}
^{3}29 \\
\times\ 4 \\
\hline
116
\end{array}
$$

$$
\begin{array}{r}
116 \\
+126 \\
\hline
232
\end{array}
$$

Answer __232__ cans of soup

After 56 cans of soup were sold, a clerk moved the remaining cans to a display case. The display case had shelves that could each hold 9 cans. How many shelves were needed to fit all the remaining cans?

$$
9\overline{)176}
$$

$$
\begin{array}{r}
232 \\
-\ 56 \\
\hline
176
\end{array}
$$

Answer 20 shelves

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The response correctly determines the total number of cans on the two sets of shelves ($3 \times 42 = 126$ and $4 \times 29 = 116$); however, an addition error ($116 + 126 = 232$) results in an incorrect solution (232). The solution to the second part (20) is consistent with the solution to the first part since $232 - 56 = 176$ and $176 \div 9 = 19\frac{5}{9}$ or 20. Per scoring policy #11, any work shown for the second part will not be scored.

A grocery store had cans of soup on 7 different shelves. The bottom 4 shelves each had 29 cans. The top 3 shelves each had 42 cans. What was the total number of cans on the shelves?

Show your work.

$$29$$
$$+42$$
$$71$$

Answer _____71_____ cans of soup

After 56 cans of soup were sold, a clerk moved the remaining cans to a display case. The display case had shelves that could each hold 9 cans. How many shelves were needed to fit all the remaining cans?

$$9\overline{)56}$$
$$54$$
$$02$$

Answer _____2_____ shelves

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The response incorrectly determines the total number of cans (71); however, in the second part, the number of shelves needed is consistent with the solution to the first part, 71 – 56 = 15 and 15 ÷ 9 = 1⁶⁄₉ or 2. Note: Work is not required for the second part and is shown here as a tool for assessing if the second solution is consistent with the first solution.

A grocery store had cans of soup on 7 different shelves. The bottom 4 shelves each had 29 cans. The top 3 shelves each had 42 cans. What was the total number of cans on the shelves?

Show your work.

42 cans of + 29 cans = 71 cans of in
soop   of soup   Pi soap

check
$$\begin{array}{r} {}^{6}7\overset{11}{1}{}^{4} \\ -42 \\ \hline 29 \end{array}$$ ✓

Answer __71__ cans of soup

After 56 cans of soup were sold, a clerk moved the remaining cans to a display case. The display case had shelves that could each hold 9 cans. How many shelves were needed to fit all the remaining cans?

$$\begin{array}{r} {}^{6}7\overset{11}{1} \\ 56 \\ \hline 15 \end{array}$$ 71 - X 1 $9\overline{)15}$ 9
9   9
9   6

Cans remaining, that means they will have to take up another shelf

Answer __2__ shelves

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The response incorrectly determines the total number of cans (71); however, in the second part, the number of shelves needed is consistent with the solution to the first part, 71 – 56 = 15 and 15 ÷ 9 = 1⁶⁄₉ or 2.

A grocery store had cans of soup on 7 different shelves. The bottom 4 shelves each had 29 cans. The top 3 shelves each had 42 cans. What was the total number of cans on the shelves?

Show your work.

1
42
+29
71

Answer _____ 71 _____ cans of soup

After 56 cans of soup were sold, a clerk moved the remaining cans to a display case. The display case had shelves that could each hold 9 cans. How many shelves were needed to fit all the remaining cans?

4 16
56
- 9
47

Answer _____ 47 _____ shelves

Score Point 0 (out of 3 points)

This response does not demonstrate even a limited understanding of the mathematical concepts embodied in the task. The response incorrectly determines the total number of cans (71), and while this is the same solution shown in Guide Papers score point 1, the solution to the second part (47) is inconsistent with the solution to the first part.

A grocery store had cans of soup on 7 different shelves. The bottom 4 shelves each had 29 cans. The top 3 shelves each had 42 cans. What was the total number of cans on the shelves?

Show your work.

$$\begin{array}{r} 42 \\ +29 \\ \hline 71 \end{array}$$

Answer _____71_____ cans of soup

After 56 cans of soup were sold, a clerk moved the remaining cans to a display case. The display case had shelves that could each hold 9 cans. How many shelves were needed to fit all the remaining cans?

9, 1·8, 27, 36, 45, 54

2 were extras,

6 or 7

Answer _____7_____ shelves

Score Point 0 (out of 3 points)

This response does not demonstrate even a limited understanding of the mathematical concepts embodied in the task. The response incorrectly determines the total number of cans (71), and while this is the same solution shown in Guide Papers score point 1, the solution to the second part (7) is inconsistent with the solution to the first part.

In September, Jerry read for $\frac{2}{5}$ of an hour every day for 20 days. How many hours did he read in September?

Show your work.

Answer _____ hours

In October, Jerry read for $\frac{3}{5}$ of an hour every day for 20 days. How many **more** hours did Jerry read in October than in September?

Answer _____ hours

Measured CCLS: 4.NF.4.c

Commentary: This question measures 4.NF.4.c because it assesses the student's ability to solve word problems involving multiplication of a fraction by a whole number.

Extended Rationale: This question asks students to find the number of hours Jerry read for 20 days in September if he read for $\frac{2}{5}$ of an hour each day. Students must then find the difference between the number of hours Jerry read in September and October if he read for 20 days in October for $\frac{3}{5}$ of an hour each day. Students must include a set of computations that will lead to a correct response, where work is provided to defend each step in the process. As indicated in the rubric, student responses will be rated on whether they show sufficient work to indicate a thorough understanding of how to solve word problems involving multiplication of a fraction by a whole number. The determining factor in demonstrating a thorough understanding is using mathematically sound procedures to lead to a correct response.

The correct answers are 8 hours for September and a difference of 4 hours between September and October. One possible solution involves multiplying the number of days read in September, 20, by $\frac{2}{5}$, the number of hours read per day in that month:

$20 \times \frac{2}{5} = 8$

The student would then multiply the number of days read in October, 20, by $\frac{3}{5}$, the number of hours read per day in that month:

$20 \times \frac{3}{5} = 12$

Finally, to find the difference, the student would subtract, to get an answer of 4 hours:

$12 - 8 = 4$

In September, Jerry read for $\frac{2}{5}$ of an hour every day for 20 days. How many hours did he read in September?

Show your work.

$$\frac{2 \times 20 = 40}{5} \qquad \frac{5}{2}$$

$$5\overline{)40}^{8}$$
$$\underline{-40}$$
$$\ 0$$

Answer _____ 8 _____ hours

In October, Jerry read for $\frac{3}{5}$ of an hour every day for 20 days. How many **more** hours did Jerry read in October than in September?

$$\frac{3 \times 20 = 60}{5} \qquad \frac{}{5}$$

$$\frac{\overset{12}{\cancel{8}}}{4}$$

$$5\overline{)60}^{12}$$
$$\underline{-60}$$
$$\ 0$$

Answer _____ 4 _____ hours

Score Point 3 (out of 3 points)

This response includes the correct solutions (8, 4) and demonstrates a thorough understanding of the mathematical concepts in the task. The number of hours Jerry read in September is determined using sound mathematical procedures ($\frac{2}{5} \times 20 = \frac{40}{5}$; $40 \div 5 = 8$). Since no work is required to determine how many more hours he read in October than in September, per scoring policy #11, any work shown in the second part will not be scored.

In September, Jerry read for $\frac{2}{5}$ of an hour every day for 20 days. How many hours did he read in September?

Show your work.

$$5\overline{)2.0}^{\,0.4}$$
$$2\,0$$

$$20$$
$$\times\ .4$$
$$\overline{8.0}$$

Answer ____80____ hours

In October, Jerry read for $\frac{3}{5}$ of an hour every day for 20 days. How many **more** hours did Jerry read in October than in September?

$$20$$
$$\times\ .6$$
$$\overline{12.0}$$

$$5\overline{)3.0}^{\,0.6}$$

Answer ____4.0____ hours

Score Point 3 (out of 3 points)

This response includes the correct solutions (8.0, 4.0) and demonstrates a thorough understanding of the mathematical concepts in the task. The number of hours Jerry read in September is determined using sound mathematical procedures (2 ÷ 5 = 0.4; .4 × 20 = 8.0). Since no work is required to determine how many more hours he read in October than in September, per scoring policy #11, any work shown in the second part will not be scored.

In September, Jerry read for $\frac{2}{5}$ of an hour every day for 20 days. How many hours did he read in September?

Show your work.

$\frac{1}{5}$ of $60 = 12$ min. so

$\frac{2}{5}$ of $60 = 24$ min.

$60\overline{)480}$
-300 | 5
180
-180 | 3
0
8

$\begin{array}{r} 24 \\ \times 20 \\ \hline 00 \\ +480 \\ \hline 480 \end{array}$

Answer _____8_____ hours

In October, Jerry read for $\frac{3}{5}$ of an hour every day for 20 days. How many **more** hours did Jerry read in October than in September?

$\begin{array}{r} 1 \\ 36 \\ \times 20 \\ \hline 00 \\ +720 \\ \hline 720 \end{array}$

$\begin{array}{r} 12 \\ 60\overline{)720} \\ -600 \\ \hline 120 \\ -120 \\ \hline 0 \end{array}$ 10 2

If $\frac{2}{5} = 24$ min.

$\frac{3}{5}$ of $60 = 36$ min.

Answer _____12_____ hours

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The correct solution (8) to the number of hours read in September is determined using a mathematically sound procedure (²⁄₅ of 60 = 24 min., 24 × 20 = 480, 480 ÷ 60 = 8). The solution (12) to the second part is incorrect and as per scoring policy #11, the work in the second part is not assessed.

In September, Jerry read for $\frac{2}{5}$ of an hour every day for 20 days. How many hours did he read in September?

Show your work.

$$\frac{2}{5} \times 20 = \frac{40}{5} = 9$$

Answer ___9___ hours

In October, Jerry read for $\frac{3}{5}$ of an hour every day for 20 days. How many **more** hours did Jerry read in October than in September?

$$\frac{3}{5} \times 20 = \frac{60}{5} = 12$$

Answer ___3___ hours

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The solution to the number of hours read in September (9) is incorrect due to a minor calculation error in an otherwise mathematically sound procedure ($^2/_5 \times 20 = {}^{40}/_5 = 9$). However, the solution to how many more hours are read in October than in September (3) is correct based on the first solution, $12 - 9 = 3$.

In September, Jerry read for $\frac{2}{5}$ of an hour every day for 20 days. How many hours did he read in September?

Show your work.

$\frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5} +$

$\frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5} \frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5}$

$\frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5} = \frac{38}{5}$

Answer _____ $\frac{38}{5}$ _____ hours

In October, Jerry read for $\frac{3}{5}$ of an hour every day for 20 days. How many **more** hours did Jerry read in October than in September?

$\frac{3}{5} + \frac{3}{5} + \frac{3}{5} + \frac{3}{5} + \frac{3}{5} + \frac{3}{5} + \frac{3}{5} + \frac{3}{5} +$

$\frac{3}{5} + \frac{3}{5} + \frac{3}{5} + \frac{3}{5} + \frac{3}{5} + \frac{3}{5} + \frac{3}{5} +$

$\frac{3}{5} + \frac{3}{5} + \frac{3}{5} + \frac{3}{5} + \frac{3}{5} = \frac{60}{5}$

Answer _____ $\frac{60}{5}$ _____ hours

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The solution to the number of hours read in September is incorrect ($^{38}/_5$); however, the incorrect solution is the result of a minor addition error in an otherwise mathematically sound process, adding $^2/_5$ twenty times. The solution to how many more hours are read in October than in September ($^{60}/_5$) is incorrect.

In September, Jerry read for $\frac{2}{5}$ of an hour every day for 20 days. How many hours did he read in September?

Show your work.

$\frac{2}{5} \times 20$

$\begin{array}{r} 20 \\ \times\ 2 \\ \hline 40 \end{array}$

$\overline{5}$

$\frac{40}{5}$

Answer ___$\frac{40}{5}, 40$___ hours

In October, Jerry read for $\frac{3}{5}$ of an hour every day for 20 days. How many **more** hours did Jerry read in October than in September?

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

$\begin{array}{r} 20 \\ 3 \\ \hline 23 \end{array}$

$\overline{5}$

Answer ___23___ hours

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The solution to the number of hours read in September is initially correct (⁴⁰/₅) with a mathematically sound process (²/₅ × 20, 20 × 2 = 40 and ⁴⁰/₅); however, a second incorrect solution (40) reflects an underlying faulty mathematical reasoning with regards to the significance of denominators. The solution to how many more hours are read in October than in September (23) is incorrect.

In September, Jerry read for $\frac{2}{5}$ of an hour every day for 20 days. How many hours did he read in September?

Show your work.

$$\frac{2 \times 20}{5 \times 20} = \frac{40}{100}$$

$$\begin{array}{r} 100 \\ + 40 \\ \hline 140 \end{array}$$

Answer ___140___ hours

In October, Jerry read for $\frac{3}{5}$ of an hour every day for 20 days. How many **more** hours did Jerry read in October than in September?

$$\frac{3 \times 20}{5 \times 20} = \frac{60}{100}$$

$$\begin{array}{r} 160 \\ -140 \\ \hline 20 \end{array}$$

$$\begin{array}{r} 100 \\ + 60 \\ \hline 160 \end{array}$$

Answer ___20___ hours

Score Point 0 (out of 3 points)

This response does not demonstrate even a limited understanding of the mathematical concepts embodied in the task. Both solutions (140, 20) and the process to determine the first solution ($^2/_5 \times {}^{20}/_{20} = {}^{40}/_{100}$, 100 + 40 = 140) are incorrect.

In September, Jerry read for $\frac{2}{5}$ of an hour every day for 20 days. How many hours did he read in September?

Show your work.

$20 \quad \frac{2^{\times 4}}{5}$

$$\frac{2 \times 4}{5 \times 4} = \frac{8}{20}$$

Answer $\frac{8}{20}$ hours

In October, Jerry read for $\frac{3}{5}$ of an hour every day for 20 days. How many **more** hours did Jerry read in October than in September?

$$\frac{3 \times 4}{5 \times 4} = \frac{12}{20}$$

Answer $\frac{12}{20}$ hours

Score Point 0 (out of 3 points)

This response does not demonstrate even a limited understanding of the mathematical concepts embodied in the task. Both solutions ($^8/_{20}$, $^{12}/_{20}$) and the mathematical process used in the first part ($^2/_5 \times {^4/_4}$) are incorrect.

The table below shows the numbers of tickets sold at a movie theater on Friday.

NUMBER OF TICKETS SOLD

Day	Adult Tickets	Children's Tickets
Friday	976	1,678
Saturday		

The number of each type of ticket sold on Saturday is described below.

- Adult tickets—2 times as many as the number of adult tickets sold on Friday
- Children's tickets—3 times as many as the number of children's tickets sold on Friday

Complete the table above to show the numbers of tickets sold on Saturday.

What is the total number of tickets sold over these two days?

Show your work.

Answer _____

Measured CCLS: 4.NBT.5

Commentary: This question measures 4.NBT.5 because it assesses a student's ability to multiply a whole number up to four digits by a one-digit whole number. The student may use strategies based on place value and the properties of operations.

Extended Rationale: This question asks the student first to find the number of each type of ticket sold at a movie theater on Saturday and then to find the total number of tickets sold at a movie theater on Friday and Saturday. Students must include a set of computations, visual models, or other work to show each step in finding the answers. As indicated in the rubric, student responses will be rated on whether they show sufficient work to indicate a thorough understanding of multiplying a whole number up to four digits by a one-digit whole number. The determining factor in demonstrating a thorough understanding is using mathematically sound procedures to lead to a correct response.

To answer the first part of the question, the student must determine the number of adult tickets sold on Saturday, which is two times the amount on Friday (976), and the number of children's tickets sold on Saturday, which is three times the amount on Friday (1,678). The student could use the standard algorithm or a visual model; both approaches rely on understanding of place value and the properties of operations:

$$
\begin{array}{r} 976 \\ \times\ \ 2 \\ \hline 1,952 \end{array}
\qquad
\begin{array}{r} 1,678 \\ \times\ \ \ 3 \\ \hline 5,034 \end{array}
$$

	900	70	6
2	1,800	140	12

$$1,800 + 140 + 12 = 1,952$$

	1,000	600	70	8
3	3,000	1,800	210	24

$$3,000 + 1,800 + 210 + 24 = 5,034$$

Either method results in answers of 1,952 and 5,034.

To answer the second part of the question, the student could add the numbers for all four days together:

976 + 1,952 + 1,678 + 5,034 = 9,640

The sum is 9,640 tickets sold over the four days, in total.

The table below shows the numbers of tickets sold at a movie theater on Friday.

NUMBER OF TICKETS SOLD

Day	Adult Tickets	Children's Tickets
Friday	976	1,678
Saturday	1,952	5,034

$$\begin{array}{r} {}^{1\ 1}976 \\ \times\ \ 2 \\ \hline 1,952 \end{array}$$

The number of each type of ticket sold on Saturday is described below.

- Adult tickets—2 times as many as the number of adult tickets sold on Friday
- Children's tickets—3 times as many as the number of children's tickets sold on Friday

Complete the table above to show the numbers of tickets sold on Saturday.

What is the total number of tickets sold over these two days?

Show your work.

$$1678$$

$$\begin{array}{r} 1678 \\ \times\ \ 3 \\ \hline 5034 \end{array}$$

adult
$$\begin{array}{r} {}^{1\ 1}976 \\ \times\ \ 2 \\ \hline 1,952 \end{array}$$

$$\begin{array}{r} 5034 \\ 1952 \\ 1678 \\ +\ 976 \\ \hline 9,640 \end{array}$$

Answer ___9,640___ tickets

Score Point 3 (out of 3 points)

This response includes the correct solutions for the number of adult and children's tickets sold on Saturday (1,952 and 5,034) and the total number of tickets sold over the two days (9,640), demonstrating a thorough understanding of the mathematical concepts in the task. A mathematically sound procedure is used to correctly determine the total number of tickets sold (5,034 + 1,952 + 1,678 + 976 = 9,640).

The table below shows the numbers of tickets sold at a movie theater on Friday.

NUMBER OF TICKETS SOLD

Day	Adult Tickets	Children's Tickets
Friday	976	1,678
Saturday	1952	5034

The number of each type of ticket sold on Saturday is described below.

- Adult tickets—2 times as many as the number of adult tickets sold on Friday
- Children's tickets—3 times as many as the number of children's tickets sold on Friday

Complete the table above to show the numbers of tickets sold on Saturday.

What is the total number of tickets sold over these two days?

Show your work.

P#1

$$
\begin{array}{c}
900 \quad 70 \quad 6
\end{array}
$$

| 2 | 1800 | 140 | 12 | = 1952 |

| 3 | 3000 | 1500 | 210 | 24 |
1000   600   70   8

+ 24
  210
  234
+ 4800
  5034

$$
\begin{array}{r}
1678 \\
+5034 \\
\hline
6712
\end{array}
\qquad
\begin{array}{r}
976 \\
+1952 \\
\hline
2928
\end{array}
$$

$$
\begin{array}{r}
6712 \\
+2928 \\
\hline
9640
\end{array}
$$

P# 2

Answer ___9640___

Score Point 3 (out of 3 points)

This response includes the correct solutions for the number of adult and children's tickets sold on Saturday (1952 and 5034) and the total number of tickets sold over the two days (9640), demonstrating a thorough understanding of the mathematical concepts in the task. The total number of tickets sold over the two days is correctly determined using a mathematically sound procedure (1678 + 5034 = 6712, 976 + 1952 = 2928, 6712 + 2928 = 9640).

The table below shows the numbers of tickets sold at a movie theater on Friday.

NUMBER OF TICKETS SOLD

Day	Adult Tickets	Children's Tickets
Friday	976	1,678
Saturday	1,952	5,034

The number of each type of ticket sold on Saturday is described below.

- Adult tickets—2 times as many as the number of adult tickets sold on Friday
- Children's tickets—3 times as many as the number of children's tickets sold on Friday

Complete the table above to show the numbers of tickets sold on Saturday.

What is the total number of tickets sold over these two days?

Show your work.

$$1,678 \times 3 = 5,034$$

$$976 \times 2 = 1,952$$

$$1,952 + 976 = 2,928$$

$$5,034 + 1,678 = 6,712$$

$$2,928 + 6,712 = 8,640$$

Answer _____8,640 Tickets_____

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The response includes the correct solutions for the number of adult and children's tickets sold on Saturday (1,952 and 5,034). The calculations of the total number of adult (1,952 + 976 = 2,928) and children's (5,034 + 1,678 = 6,712) tickets sold over the weekend are correct; however, a minor addition error in the calculation of the total number of tickets sold over the two days results in an incorrect solution (2,928 + 6,712 = 8,640).

105

The table below shows the numbers of tickets sold at a movie theater on Friday.

NUMBER OF TICKETS SOLD

Day	Adult Tickets	Children's Tickets
Friday	976	1,678
Saturday	1,952	4,924

The number of each type of ticket sold on Saturday is described below.

- Adult tickets—2 times as many as the number of adult tickets sold on Friday
- Children's tickets—3 times as many as the number of children's tickets sold on Friday

Complete the table above to show the numbers of tickets sold on Saturday.

What is the total number of tickets sold over these two days?

Show your work.

$$1,678$$
$$976$$
$$6,876$$
$$2,654$$
$$\overline{9,530}$$

$$976$$
$$\times\ 2$$
$$\overline{1,952}$$

$$1,678$$
$$\times\ 3$$
$$\overline{4,924}$$

$$4,924$$
$$1,952$$
$$\overline{6,876}$$

Answer _____9,530_____

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The response includes the correct solution for the adult tickets sold on Saturday (1,952); however, the number of children's tickets sold on Saturday is incorrect (4,924). The solution to the total number of tickets sold over the two days is consistent with the error in the number of children's tickets (1,678 + 976 = 2,654, 4,924 + 1,952 = 6,876 and 6,876 + 2,654 = 9,530).

The table below shows the numbers of tickets sold at a movie theater on Friday.

NUMBER OF TICKETS SOLD

Day	Adult Tickets	Children's Tickets
Friday	976	1,678
Saturday		

The number of each type of ticket sold on Saturday is described below.

- Adult tickets—2 times as many as the number of adult tickets sold on Friday
- Children's tickets—3 times as many as the number of children's tickets sold on Friday

Complete the table above to show the numbers of tickets sold on Saturday.

What is the total number of tickets sold over these two days?

Show your work.

$$\begin{array}{r} 2\,2\,2 \\ 1,678 \\ \times\quad\quad 3 \\ \hline 5,034 \end{array}$$

$$\begin{array}{r} 4\,1 \\ 976 \\ \times\quad 2 \\ \hline 2,952 \text{ saturday} \end{array}$$

Adult   Children's

Answer   2,152 sat   5034 sat

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. While not recorded in the table, the number of adult and children's tickets sold on Saturday are acceptably recorded in the second section, with a correct solution for child tickets (1,678 × 3 = 5,034) and an incorrect solution for adult tickets due to a multiplication error (976 × 2 = 2,152). No work is shown to determine the total number of tickets sold over the two days, demonstrating a misunderstanding of an important aspect of the task.

The table below shows the numbers of tickets sold at a movie theater on Friday.

NUMBER OF TICKETS SOLD

Day	Adult Tickets	Children's Tickets
Friday	976	1,678
Saturday	978	1,681

The number of each type of ticket sold on Saturday is described below.

- Adult tickets—2 times as many as the number of adult tickets sold on Friday
- Children's tickets—3 times as many as the number of children's tickets sold on Friday

Complete the table above to show the numbers of tickets sold on Saturday.

What is the total number of tickets sold over these two days?

Show your work.

Adult

```
   976
+  978
 1,1942
```

children

```
   1678
+  1681
  2,1759
```

Answer 1,942 & 2,759

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The number of adult and children's tickets sold on Saturday are incorrect (978, 1,681). Saturday totals reflect a lack of essential understanding of the underlying mathematical concepts by adding 2 to the Friday adult ticket total and adding 3 to the Friday child ticket total. The Friday and Saturday totals for each category are added together; however, both addition procedures include calculation errors (976 + 978 = 1,942, 1,678 + 1,681 = 2,759) and result in an incorrect solution of a total for Friday sales and a total for Saturday sales (1,942 & 2,759), not one cumulative total for both days.

The table below shows the numbers of tickets sold at a movie theater on Friday.

NUMBER OF TICKETS SOLD

Day	Adult Tickets	Children's Tickets
Friday	976	1,678
Saturday		

The number of each type of ticket sold on Saturday is described below.

- Adult tickets—2 times as many as the number of adult tickets sold on Friday
- Children's tickets—3 times as many as the number of children's tickets sold on Friday

Complete the table above to show the numbers of tickets sold on Saturday.

What is the total number of tickets sold over these two days?

Show your work.

$$+ \quad \begin{array}{r} 1,673 \\ 976 \\ \hline 2,649 \end{array}$$

Answer _____ 2,649 _____

Score Point 0 (out of 3 points)

This response does not demonstrate even a limited understanding of the mathematical concepts embodied in the task. No solutions are recorded for Saturday sales. Friday's ticket sales, with a transcription error, are added (1,673 [not 1,678] + 976 = 2,649) and the sum (2,649) is provided as the total for two days. Holistically, this is not sufficient to demonstrate even a limited understanding of the mathematical concepts.

The table below shows the numbers of tickets sold at a movie theater on Friday.

NUMBER OF TICKETS SOLD

Day	Adult Tickets	Children's Tickets
Friday	976	1,678
Saturday		

The number of each type of ticket sold on Saturday is described below.

- Adult tickets—2 times as many as the number of adult tickets sold on Friday
- Children's tickets—3 times as many as the number of children's tickets sold on Friday

Complete the table above to show the numbers of tickets sold on Saturday.

What is the total number of tickets sold over these two days?

Show your work.

$$
\begin{array}{r}
976 \\
+3 \\
\hline
979
\end{array}
\qquad
\begin{array}{r}
1,6\overset{1}{7}8 \\
3 \\
\hline
1,681
\end{array}
$$

Answer _979 and 1,681_

Score Point 0 (out of 3 points)

This response does not demonstrate even a limited understanding of the mathematical concepts embodied in the task. No solutions are recorded for Saturday, and the solutions recorded (979 and 1,681) for the total number of tickets sold over the two days are the result of adding 3 to each of the total number of tickets sold on Friday, reflecting a lack of essential understanding of the underlying mathematical concepts of the problem.

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.