Colorado Measures of Academic Success

Grade 4 Mathematics

Answer Key with Scoring Rubrics, Sample Responses & Annotations

Practice Resource for Students

Table of Contents

ITEM INFORMATION

Colorado Academic Standard (CAS) Evidence Outcome
Describes the evidence that demonstrates that a student is meeting the grade level expectation at a mastery level.

Evidence Statement
Describes the knowledge or skills that an assessment item/task elicits from students. Full descriptions of Evidence Statements and their alignment to the Colorado Academic Standards are located at http://cde.state.co.us/assessment/cmas_testdesign.

Subclaim
The reporting category of the associated CAS.
- Mathematics
  - Subclaim A – Major Content
  - Subclaim B – Supporting Content
  - Subclaim C – Expressing Mathematical Reasoning
  - Subclaim D – Modeling and Application

ITEM TYPES
Items are questions that appear on the assessments. They are presented in three different ways.

Selected Response (Multiple Choice, Multiple Response, and Fill in the Blank)
For multiple choice and multiple response items, students select a correct answer out of provided choices. For fill in the blank items, students type/write their answer in a blank box.

Technology-Enhanced (Bar Graph, Drag and Drop, Inline Choice, Hot Spot, and Match Table Grid)
Students show their answer using technology, such as by creating a bar graph using a template provided by the online testing system or on the paper-based test. Drag and drop items require students to drag answer choices into correct answer bays (draw lines or write corresponding letters for paper-based testing). Inline choice items require students to select their answer from a drop-down menu (circle answer from a list of choices for paper-based testing) to complete a sentence or sentences. Hot spot items require students to select the correct response from its location in an image (write corresponding letters or circle answer for paper-based testing). Match table grid items require students to check checkboxes in cells to indicate a match between the column and row labels.

Constructed Response
Students construct an open-ended response.

STUDENT PERFORMANCE

P Value – Selected Response Only
The P value represents the percentage of students who answered each selected response question correctly. For example, if the P value associated with a question is 0.64, then 64% of students responded to the question with the correct answer.

Score Point Distribution – Constructed Response Only
The score point distribution provides the percentage of students who scored at each possible score point for constructed response questions.

In addition to score point distribution, the scoring guide, scoring rubric, and sample student responses at each score point are provided for constructed response items.

Note: P values and score point distributions are only available for released items (i.e., questions that previously appeared on CMAS assessments administered statewide). Items without this information were developed as sample items.

ANSWER KEY: ITEM SET 1

Item Set 1 - Question 1 (Selected Response)

What fraction, when added to $\frac{3}{8}$, would make one whole?

○ A. $\frac{3}{8}$

◉ B. $\frac{5}{8}$

○ C. $\frac{6}{8}$

○ D. $\frac{8}{8}$

Item Information		
Answer	B	
Colorado Academic Standards (CAS) Evidence Outcome	4.NF.B.3.a	Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
Evidence Statement	4.NF.3a	Understand a fraction a/b with a > 1 as a sum of fractions 1/b. a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. i) Tasks are limited to denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.
Subclaim	A – Major Content	The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	0.712	

Which values are factor pairs of 80?

Drag and drop each factor pair into the correct box.

Factor Pairs of 80	Not Factor Pairs of 80
2×40 20×4 1×80 10×8 5×16	8×0 40×40 20×60

Item Information		
Answer	See Image	
Colorado Academic Standards (CAS) Evidence Outcome	4.OA.B.4	Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite.
Evidence Statement	4.OA.4-1	Find all factor pairs for a whole number in the range 1-100.
Subclaim	B – Supporting Content	The student solves problems involving the Additional and Supporting Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	0.521	

Item Set 1 – Question 3 (Fill in the Blank)

What is the value of 96×30?

Enter your answer in the box.

2880

Item Information		
Answer	See Image	
Colorado Academic Standards (CAS) Evidence Outcome	4.NBT.B.5	Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
Evidence Statement	4.NBT.5-2	Multiply two two-digit numbers, using strategies based on place value and the properties of operations. i) Tasks do not have a context. ii) For the illustrate/explain aspect of 4.NBT.5, see 4.C.1-1.
Subclaim	A – Major Content	The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	0.387	

Item Set 1 – Question 4 (Multiple Select)

Three people play a video game.

- Person A scores 3,793 points.
- Person B scores 4,286 points.
- Person C scores 5,941 points.

Part A

How many points do the three people have in total?

○ A. 12,710

○ B. 13,020

○ C. 13,920

◉ D. 14,020

Part B

How many more points do Person A and Person C have together than Person B?

◉ A. 5,448

○ B. 5,552

○ C. 6,434

○ D. 6,574

Item Information		
Part A Answer	D	
Part B Answer	A	
Colorado Academic Standards (CAS) Evidence Outcome	4.NBT.B.4	Fluently add and subtract multi-digit whole numbers using the standard algorithm.
Evidence Statement	4.Int.8	Solve addition and subtraction word problems involving three four-digit addends, or two four-digit addends and a four-digit subtrahend. i) The given numbers are such as to require an efficient/standard algorithm (e.g., 7,263 + 4,875 + 6,901). The given numbers do not suggest any obvious ad hoc or mental strategy (as would be present for example in a case such as 6,999 + 3,501 - 5,000).
Subclaim	A – Major Content	The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	0.66	

A person made a picture graph to represent the color of the cars in a model car collection.

Model Cars

Color	Number of Cars
Black	?
Blue	🚗 🚗 🚗 🚗 🚗 🚗
Red	🚗 🚗 🚗
Yellow	🚗 🚗 🚗 🚗

KEY

Each 🚗 equals 3 model cars.

- There are a total of 6 black cars. How many cars should be used to represent the number of black cars on the graph? Use an equation or equations to show your work.
- How many fewer yellow cars are there than the sum of red and blue cars together? Use an equation or equations to show your work.
- Write an equation or equations to find the total number of cars in the collection.

Enter your answers and your equations in the space provided.

Item Information		
Answer	See Scoring Rubric and Sample Student Responses	
Colorado Academic Standards (CAS) Evidence Outcomes	3.MD.B.3	Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.
	3.OA.A.3	Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. (see Appendix, Table 2)
Evidence Statement	4.D.2	Solve multi-step contextual word problems with degree of difficulty appropriate to Grade 4, requiring application of knowledge and skills articulated in 3.OA.A, 3.OA.8, 3.NBT, and/or 3.MD. i) Tasks may have scaffolding if necessary in order to yield a degree of difficulty appropriate to Grade 4. ii) Multi step problems must have at least 3 steps. iii) Tasks do not require a student to write a single equation with a letter standing for the unknown quantity in a two-step problem, and then solve that equation. iv) Tasks may require students to write an equation as part of their work to find a solution, but students are not required to use a letter for the unknown. v) Addition, subtraction, multiplication and division situations in these problems may involve any of the basic situation types with unknowns in various positions. (See 2020 CAS, Appendix: Table 1 and Appendix: Table 2.)

Subclaim	D – Modeling and Application	The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them (MP. 1), reasoning abstractly and quantitatively (MP. 2), using appropriate tools strategically (MP.5), looking for and making use of structure (MP.7), and/or looking for and expressing regularity in repeated reasoning (MP.8).
Score Point Distribution	8.1% of students earned 6 points. 6.9% of students earned 5 points. 9.0% of students earned 4 points. 6.7% of students earned 3 points. 14.7% of students earned 2 points. 10.3% of students earned 1 point. 44.4% of students earned 0 points.	

Scoring Rubric	
Points	**Attributes**
6	Student response includes the following 6 elements. • **Modeling component** = 1 point: Valid equation or equations to find the number of cars needed to represent the black cars • **Modeling component** = 1 point: Valid equation or equations to find how many fewer yellow cars there are than the sum of red and blue cars • **Modeling component** = 1 point: Valid equation or equations to find the total number of cars in the collection • **Computation component** = 1 point: Correct number of cars used to represent the black cars, 2 • **Computation component** = 1 point: Correct difference between number of yellow cars and the sum of red and blue cars, 15 • **Computation component** = 1 point: Correct total number of cars in collection, 45 Sample Student Response: $6 \div 3 = 2$ $6 \div 3 = 2$ 2 cars should represent the number of black cars in the picture graph $6 \times 3 = 18$ blue cars $3 \times 3 = 9$ red cars $4 \times 3 = 12$ yellow cars $18 + 9 = 27$ $27 - 12 = 15$ There are 15 more red and blue cars together than yellow cars. $6 + 18 + 9 + 12 = 45$ There are 45 cars in the collection.
5	Student response includes 5 of the 6 elements.
4	Student response includes 4 of the 6 elements.
3	Student response includes 3 of the 6 elements.
2	Student response includes 2 of the 6 elements.
1	Student response includes 1 of the 6 elements.
0	Student response is incorrect or irrelevant.

Sample Student Response:	**Sample Solution 1:** 2 cars should be shown because 2 x 3 = 6 and there are 6 black cars. 3 x 6 = 18 and 3 x 3 = 9, so 18 + 9 = 27 blue and red cars. 27 − 12 = 15, so there are 15 fewer yellow cars than read and blue cars together. 6 + 12 + 18 + 9 = 45, so there are 45 total cars.
Annotation for Sample Student Response:	**Solution 1, Score Point 6** The response receives full credit. It includes each of the 6 required elements. **Modeling Component:** **Student Response:** 2 x 3 = 6 **Rationale for Score:** Valid equation or equations provided to find the number of cars needed to represent the black cars (2 x 3 = 6). The student recognizes that each car symbol represents 3 cars, and that to represent 6 black cars, 2 symbols will be needed. The multiplication equation provides this understanding by showing that 3 (cars per symbol) x 2 (symbols) will equal 6 total black cars. **Modeling Component:** **Student Response:** 3 x 6 = 18, 3 x 3 = 9, 18 + 9 = 27, 27 − 12 = 15 **Rationale for score:** Valid equation or equations provided to find how many fewer yellow cars there are than the sum of red and blue cars (3 x 6 = 18, 3 x 3 = 9, 18 + 9 = 27, 27 − 12 = 15). A valid process is used to first find the number of red cars and number of blue cars from the pictograph, then add those totals together, 27. Then subtract the total number of yellow cars, 12, to find how many fewer yellows cars there are, 15. **Modeling Component:** **Student Response:** 6 + 12 + 18 + 9 = 45 **Rationale for score:** Valid equation or equations provided to find the total number of cars in the collection (6 + 12 + 18 + 9 = 45). **Computation Component:** **Student Response:** 2 cars **Rationale for score:** Correct number of cars to represent the black cars are provided (2 cars). **Computation Component:** **Student Response:** 15 **Rationale for score:** Correct difference between number of yellow cars and the sum of red and blue cars together is provided (15 fewer yellow cars than red and blue cars together). **Computation Component:** **Student Response:** 45 **Rationale for score:** Correct total number of cars in the collection is provided (45 total cars). **Note:** Sample student responses are not representative of all correct answers for an item and are only provided as a guide to assist teachers with scoring.

What is the sum of $7{,}261$ and $1{,}000 + 500 + 30 + 2$?
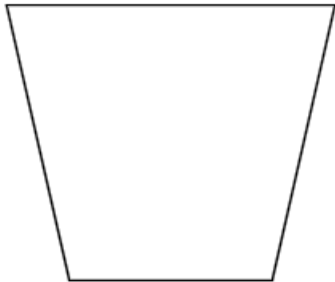
Drag and drop a number into each box to show the sum using place value. Each number may be used once, more than once, or not at all.

| 8 | thousands | 7 | hundreds | 9 | tens | 3 | ones |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Item Information		
Answer	See Image	
Colorado Academic Standards (CAS) Evidence Outcomes	4.NBT.A.2	Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
	4.NBT.B.4	Fluently add and subtract multi-digit whole numbers using the standard algorithm.
Evidence Statement	4.NBT.Int.1	Perform computations by applying conceptual understanding of place value, rather than by applying multi-digit algorithms. i) Tasks do not have a context.
Subclaim	A – Major Content	The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	0.627	

Look at this shape.

In what **two** ways can the shape be classified?

Select the **two** correct answers.

☐ A. parallelogram

☑ B. quadrilateral

☐ C. rectangle

☐ D. rhombus

☐ E. square

☑ F. trapezoid

Item Information		
Answer	B, F	
Colorado Academic Standards (CAS) Evidence Outcome	4.G.A.2	Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.
Evidence Statement	4.G.2	Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles. i) A trapezoid is defined as "A quadrilateral with at least one pair of parallel sides." ii) Tasks may include terminology: equilateral, isosceles, scalene, acute, right, and obtuse.
Subclaim	B – Supporting Content	The student solves problems involving the Additional and Supporting Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	0.367	

Item Set 1 – Question 8 (Fill in the Blank)

A farmer plants 4 rows of trees. Each row has an equal number of trees. There are 1,580 trees on the farm.

What is the number of trees in each row?

Enter your answer in the box.

395

Item Information		
Answer	See Image	
Colorado Academic Standards (CAS) Evidence Outcome	4.NBT.B.6	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
Evidence Statement	4.Int.4	Solve one-step word problems involving dividing a four-digit number by a one-digit number. i) The given numbers are such as to require a general strategy based on place value and the properties of operations (e.g., 2328 ÷ 8). ii) Quotients are whole numbers (i.e., there are no remainders). iii) Word problems shall include a variety of grade-level appropriate applications and contexts.
Subclaim	A – Major Content	The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	0.28	

A street in a town is shown.

$$25\frac{5}{6} \text{ miles}$$

$$10\frac{2}{6} \text{ miles}$$

Library   Restaurant   School
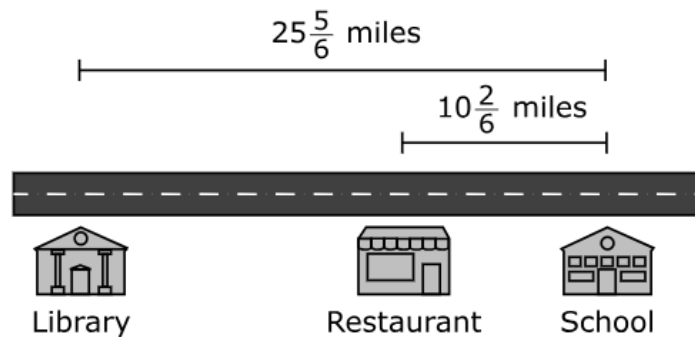
- Write an expression to find the distance, in miles, between the restaurant and the library.
- What is the difference, in miles, between the restaurant and the library?

Enter your expression and your answer in the space provided. Enter **only** your expression and your answer.

Expression: $25\frac{5}{6} - 10\frac{2}{6}$

Answer: $15\frac{3}{6}$ miles

Item Information		
Answer	See Image, or other equivalent fractions or mixed numbers.	
Colorado Academic Standards (CAS) Evidence Outcome	4.NF.B.3.d	Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
Evidence Statement	4.NF.3d	Understand a fraction a/b with a > 1 as a sum of fractions 1/b. d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem. i) Tasks are limited to denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. ii) Addition and subtraction situations are limited to the dark- or medium-shaded types in 2020 CAS, Appendix: Table 2; these situations are sampled equally. iii) Prompts do not provide visual fraction models; students may at their discretion draw visual fraction models as a strategy.
Subclaim	A – Major Content	The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	0.28	

Item Set 1 – Question 10 (TEI Inline Choice)

The state fair kept track of how many visitors it had during a 4-day period. The total amount of visitors for each day is shown.

- Friday: $19,809$
- Saturday: nineteen thousand, seven hundred eight
- Sunday: $10,000 + 9,000 + 800 + 70 + 8$
- Monday: $10,000 + 9,000 + 800 + 9$

Select from the drop-down menus to correctly complete each statement.

The number of visitors on Friday is [< ⌄] the number of visitors on Sunday.

The number of visitors on Sunday is [> ⌄] the number of visitors on Saturday.

The number of visitors on Monday is [= ⌄] the number of visitors on Friday.

Item Information		
Answer	See Image	
Colorado Academic Standards (CAS) Evidence Outcome	4.NBT.A.2	Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
Evidence Statement	4.NBT.2	Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. i) Tasks assess conceptual understanding, e.g., by including a mixture (both within and between items) of expanded form, number names, and base ten numerals.
Subclaim	A – Major Content	The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	0.411	

A person has four different pieces of string that have lengths of $\frac{4}{8}$ foot, $\frac{2}{6}$ foot, $\frac{4}{5}$ foot, and $\frac{8}{12}$ foot.

Part A

Which list orders the lengths of the pieces of strings from shortest to longest?

○ A. $\frac{4}{5}, \frac{2}{6}, \frac{4}{8}, \frac{8}{12}$

◉ B. $\frac{2}{6}, \frac{4}{8}, \frac{8}{12}, \frac{4}{5}$

○ C. $\frac{4}{5}, \frac{8}{12}, \frac{4}{8}, \frac{2}{6}$

○ D. $\frac{2}{6}, \frac{4}{5}, \frac{4}{8}, \frac{8}{12}$

Part B

A person cuts another piece of string that is $\frac{8}{12}$ foot long.

Which equivalent fractions can represent the length of the piece of string?

Select the **two** correct fractions.

☐ A. $\frac{1}{5}$

☐ B. $\frac{6}{10}$

☑ C. $\frac{2}{3}$

☑ D. $\frac{4}{6}$

☐ E. $\frac{8}{10}$

Item Information		
Part A Answer	B	
Part B Answer	C, D	
Colorado Academic Standards (CAS) Evidence Outcomes	4.NF.A.1	Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
	4.NF.A.2	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.
Evidence Statement	4.NF.A.Int.1	Apply conceptual understanding of fraction equivalence and ordering to solve simple word problems requiring fraction comparison. Content Scope: 4.NF.A i) Tasks have "thin context." ii) Tasks do not require adding, subtracting, multiplying, or dividing fractions. iii) Prompts do not provide visual fraction models; students may at their discretion draw visual fraction models as a strategy. iv) Tasks are limited to denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. v) Tasks may include fractions that equal whole numbers. Whole numbers are limited to 0 through 5.
Subclaim	A – Major Content	The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	0.358	

The fraction model shows $\frac{5}{6}$.
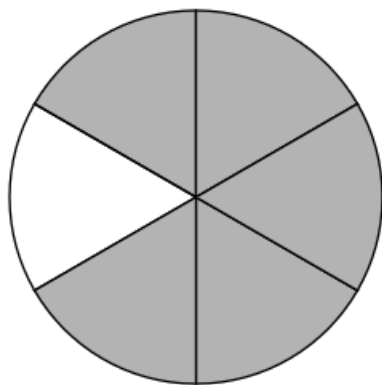
A student says that the model also shows a fraction that is equal to $\frac{7}{8}$ because $\frac{5+2}{6+2} = \frac{7}{8}$.

- Explain the mistake the student made.
- Explain how to correct the mistake the student made.
- Include a fraction that is equal to $\frac{5}{6}$ in your explanation.

Enter your explanations and your answer in the space provided.

Item Information	
Answer	See Scoring Rubric and Sample Student Responses
Colorado Academic Standards (CAS) Evidence Outcome	4.NF.A.1 — Explain why a fraction a/b is equivalent to a fraction (n x a)/(n x b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
Evidence Statement	4.C.5-2 — Distinguish correct explanation/reasoning from that which is flawed, and "if there is a flaw in the argument" present corrected reasoning. (For example, some flawed 'student' reasoning is presented and the task is to correct and improve it.) Content Scope: Knowledge and skills articulated in 4.NF.1. i) Tasks have "thin context" or no context. ii) Tasks are limited to denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. iii) Tasks may include fractions that equal whole numbers. Whole numbers are limited to 0 through 5.
Subclaim	C – Expressing Mathematical Reasoning — The student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others, and/or attending to precision when making mathematical statements.
Score Point Distribution	13.8% of students earned 3 points. 10.2% of students earned 2 points. 12.2% of students earned 1 point. 63.8% of students earned 0 points.

	Scoring Rubric
Points	**Attributes**
3	Student response includes the following 3 elements. • **Reasoning component** = 1 point: The student explains the flaw in the given process of finding the equivalent fraction. • **Reasoning component** = 1 point: The student corrects the flaw in the given process of finding the equivalent fraction. • **Computation component** = 1 point: The student provides a fraction equivalent to $\frac{5}{6}$. Sample Student Response: The student added a number to both the numerator and the denominator of $\frac{5}{6}$ to find an equivalent fraction. "To find an equivalent fraction, I can multiply by a fraction that is equal to 1. This means I can multiply both the numerator and the denominator by the same number. If I multiply $\frac{5}{6}$ by $\frac{2}{2}$, I get $\frac{5x2}{6x2} = \frac{10}{12}$. This is the same as dividing each section of the fraction model into 2, so that there are 10 shaded parts out of 12 total."
2	Student response includes 2 of the 3 elements
1	Student response includes 1 of the 3 elements.
0	Student response is incorrect or irrelevant.
Sample Student Response:	**Sample Solution 1:** The students mistake was when he added two to the denominator and the numerator. You cannot add or subtract amounts from the numerator and denominator of a fraction and get an equivalent fraction. Instead of adding, the student should multiply the numerator and the denominator by two to find an equivalent fraction, $\frac{5}{6} \times \frac{2}{2} = \frac{10}{12}$. The equivalent fraction would be $\frac{10}{12}$.

Annotation for Sample Student Response:	**Solution 1, Score Point 3**
	The response receives full credit. It includes each of the 3 required elements.
	Reasoning Component:
	• **Student Response:** The students mistake was when he added two to the denominator and the numerator.
	    ○ **Rationale for Score:** A valid explanation of the mistake the student made is provided (The students mistake was when he added two to the denominator and the numerator). Explanations will vary, but the understanding that addition is not a valid method to find equivalent fractions must be provided to receive credit for this element.
	Reasoning Component:
	• **Student Response:** Instead of adding, the student should multiply the numerator and the denominator by two to find an equivalent fraction, $\frac{5}{6} \times \frac{2}{2}$.
	    ○ **Rationale for score:** A valid explanation of how to correct the mistake the student made is provided (Instead of adding, the student should multiply the numerator and the denominator by two to find an equivalent fraction, $\frac{5}{6} \times \frac{2}{2}$). Either the explanation given to "multiply the numerator and the denominator by two" or the expression showing the multiplication by two, $\frac{5}{6} \times \frac{2}{2}$, would be acceptable for credit for this element.
	Computation Component:
	• **Student Response:** $\frac{10}{12}$
	    ○ **Rationale for score:** A correct fraction equivalent to $\frac{5}{6}$ is provided ($\frac{10}{12}$).
	Note: Sample student responses are not representative of all correct answers for an item and are only provided as a guide to assist teachers with scoring.

Item Set 1 - Question 13 (Fill in the Blank, Selected Response)

The measure of angle *PQR* is 150°.
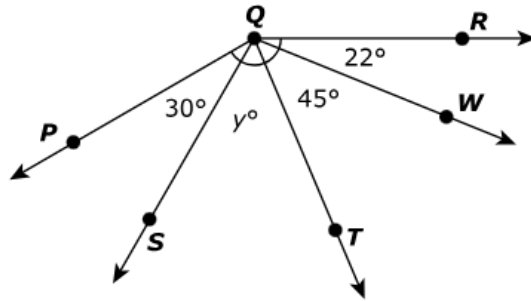
Part A

What is the measure, in degrees, of angle *TQR*?

Enter your answer in the box.

67

Part B

What is the measure, in degrees, of angle *PQT*?

○ A. 53

○ B. 75

◉ C. 83

○ D. 97

Item Information		
Part A Answer	See Image	
Part B Answer	C	
Colorado Academic Standards (CAS) Evidence Outcome	4.MD.C.7	Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.
Evidence Statement	4.MD.7	Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.
Subclaim	B – Supporting Content	The student solves problems involving the Additional and Supporting Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	0.343	

ANSWER KEY: ITEM SET 2

Item Set 2 – Question 1 (TEI Graph)

Create a line segment parallel to the given line segment.

Select **two** places on the coordinate grid to plot the points.
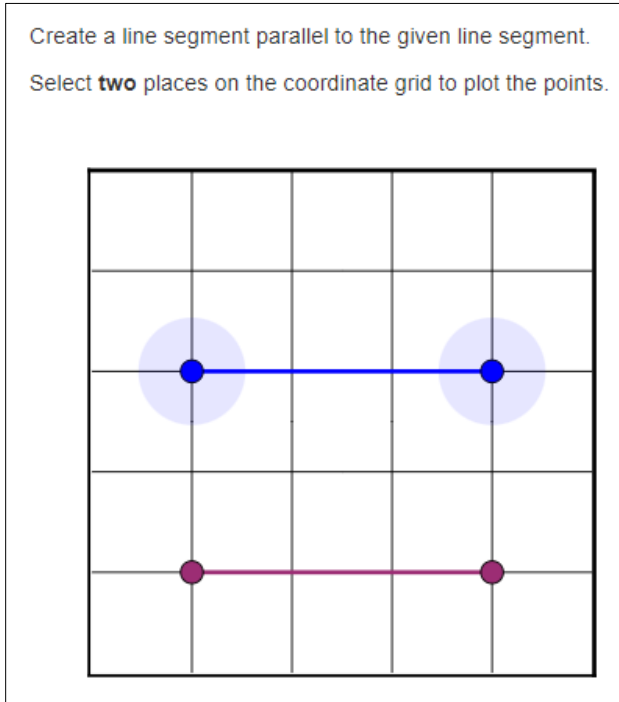
Item Information		
Answer	See Image. Note: any additional mathematically equivalent response is acceptable	
Colorado Academic Standards (CAS) Evidence Outcome	4.G.A.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
Evidence Statement	4.G.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
Subclaim	B - Supporting Content	The student solves problems involving the Additional and Supporting Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	0.847	

Item Set 2 – Question 2 (Selected Response)

A photographer has a picture album that holds 100 pictures. The photographer fills $\frac{57}{100}$ of the album with pictures of trees. She fills $\frac{30}{100}$ of the album with pictures of animals.

Part A

What fraction of the album is filled with either pictures of trees or animals?

- ○ A. $\frac{27}{100}$

- ○ B. $\frac{54}{100}$

- ○ C. $\frac{60}{100}$

- ◉ D. $\frac{87}{100}$

Part B

The photographer fills $\frac{9}{100}$ of the album with pictures of flowers.

What decimal represents the part of the album that is filled with flowers?

- ○ A. 0.009

- ◉ B. 0.09

- ○ C. 0.90

- ○ D. 1.09

Item Information		
Part A Answer	D	
Part B Answer	B	
Colorado Academic Standards (CAS) Evidence Outcomes	4.NF.C.5	Express a fraction with denominator 10 as an equivalent fraction with denominator 100 and use this technique to add two fractions with respective denominators 10 and 100. (Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade.) For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100. (CCSS: 4.NF.C.5)
	4.NF.C.6	Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.
Evidence Statement	4.NF.Int.2	Solve one-step addition word problems. Content Scope: 4.NF.5, 4.NF.6.
Subclaim	A – Major Content	The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	0.722	

Item Set 2 – Question 3 (Multiple Select)

Which two numbers are prime numbers?

Select the **two** correct answers.

☐ A. 27

☑ B. 37

☐ C. 57

☑ D. 67

☐ E. 77

Item Information		
Answer	B, D	
Colorado Academic Standards (CAS) Evidence Outcome	4.OA.B.4	Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.
Evidence Statement	4.OA.4-4	Determine whether a given whole number in the range 1–100 is prime or composite.
Subclaim	B - Supporting Content	The student solves problems involving the Additional and Supporting Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	0.208	

Item Set 2 – Question 4 (TEI Drag and Drop)

The value of the digit 6 in the number 3,694 is equal to 600.

Drag and drop a number into each box to show the correct values of the digit 6. Each number may be used once, more than once, or not at all.

| 6 | 60 | 600 | 6,000 |

When moved one place to the left, the value of the digit 6 in the number 3,694 would equal

| 6,000 |
.

When moved one place to the right, the value of the digit 6 in the number 3,694 would equal

| 60 |
.

Item Information		
Answer	See Image	
Colorado Academic Standards (CAS) Evidence Outcome	4.NBT.A.1	Explain that in a multi-digit whole number, a digit in one place represents ten × what it represents in the place to its right. For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.
Evidence Statement	4.NBT.1	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. For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.
Subclaim	A – Major Content	The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	0.547	

The length of a rectangular room is 8 feet. The area of the room is 56 square feet.
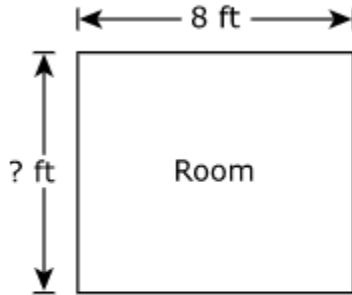
What is the perimeter, in feet, of the room?

Enter your answer in the box.

30

Item Information		
Answer	See Image	
Colorado Academic Standards (CAS) Evidence Outcome	4.MD.A.3	Apply the area and perimeter formulas for rectangles in real-world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.
Evidence Statement	4.MD.3	Solve real-world and mathematical problems about perimeter involving grade-level addition and subtraction of fractions, such as finding an unknown side of a rectangle. Content Scope: 4.NF.3, 4.MD.3.
Subclaim	B - Supporting Content	The student solves problems involving the Additional and Supporting Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	0.266	

Where is $\frac{42}{100}$ located on the number line?

Select a place on the number line to plot the point.

Item Information		
Answer	See Image	
Colorado Academic Standards (CAS) Evidence Outcome	4.NF.C.6	Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as $\frac{62}{100}$; describe a length as 0.62 meters; locate 0.62 on a number line diagram.
Evidence Statement	4.NF.6	Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as $\frac{62}{100}$; describe a length as 0.62 meters; locate 0.62 on a number line diagram. i) Measuring to the nearest mm or cm is equivalent to measuring on the number line.
Subclaim	A – Major Content	The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	0.596	

A baker has cupcake pans that can hold 12 cupcakes each. The baker made 9 cupcake pans full of vanilla cupcakes and 4 cupcake pans full of strawberry cupcakes.

The baker then puts the cupcakes into boxes. The baker puts 8 cupcakes in each box.

What is the **fewest** number of boxes the baker will need for all the cupcakes?

○ A. 18

◉ B. 20

○ C. 24

○ D. 32

Item Information		
Answer	B	
Colorado Academic Standards (CAS) Evidence Outcome	4.OA.A.3	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
Evidence Statement	4.OA.3-2	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, in which remainders must be interpreted. i) Assessing reasonableness of answer is not assessed here, see 4.C.5-1 and 4.C.6-1. ii) Tasks involve interpreting remainders. iii) Multi-step problems must have at least 3 steps.
Subclaim	A – Major Content	The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	0.328	

The table shows the items and amounts needed to make 1 bottle of bubble mix. The two items in a bubble mix are water and dish soap.

Bubble Mix

Item	Amount
water	$\frac{5}{8}$ cup
dish soap	$\frac{2}{8}$ cup

Part A

How much more water than dish soap is needed to make 1 bottle of bubble mix?

Enter your answer in the space provided. Enter **only** your answer.

$\frac{3}{8}$ cup

Part B

A student wants to make enough bubble mix for 7 bottles.

- How many cups of bubble mix does the student need to make to fill 7 bottles? Include in your answer the number of cups of water and the number of cups of dish soap the student needs.
- Explain your answer or show your work.

Enter your answers and your work or explanation in the space provided.

Item Information	
Answer	See Scoring Rubric and Sample Student Responses
Colorado Academic Standards (CAS) Evidence Outcomes	4.NF.B.4.c — Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. For example, if each person at a party will eat $\frac{3}{8}$ of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?
	4.NF.B.3.d — Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
Evidence Statement	4.D.1 — Solve multi-step contextual word problems with degree of difficulty appropriate to Grade 4, requiring application of knowledge and skills articulated in Type I, Sub-Claim A Evidence Statements. i) Tasks may have scaffolding if necessary, in order yield a degree of difficulty appropriate to Grade 4. ii) Multi step problems must have at least 3 steps.
Subclaim	D – Modeling and Application — The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them (MP. 1) ,reasoning abstractly and quantitatively (MP. 2), using appropriate tools strategically (MP.5), looking for and making use of structure (MP.7), and/or looking for and expressing regularity in repeated reasoning (MP.8).
Score Point Distribution	7.4% of students earned 3 points. 3.8% of students earned 2 points. 54.8% of students earned 1 point. 34.1% of students earned 0 points.

Scoring Rubric – Part A	
Points	**Attributes**
1	Computation Component: Student provides the correct fraction: $\frac{3}{8}$ Note: Other equivalent fractions are acceptable.
0	Student response is incorrect or irrelevant.

Scoring Rubric – Part B	
Points	**Attributes**
2	Student response includes each of the following 2 elements. • **Computation component**: Correct number of cups of bubble mix, water, and dish soap that is needed to fill 7 bottles. • **Modeling component**: Valid explanation or work to determine the number of cups of bubble mix, water and dish soap that is needed to fill 7 bottles.
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.
Sample Student Response:	$(\frac{5}{8} \times 7) + (\frac{2}{8} \times 7) = \frac{49}{8} = 6\frac{1}{8}$ cups for 7 bottles of bubble mix. First, I found out how much water I needed to make the 7 bottles of bubble mix by $\frac{5}{8} \times 7 = \frac{35}{8}$ cups of water. Then, I found out how much dish soap I needed by $\frac{2}{8} \times 7 = \frac{14}{8}$.

Annotation for Sample Student Response:	**Score Point 2**
	The response receives full credit. It includes each of the 2 required elements.
	Computation Component:
	• **Student Response:** $6\frac{1}{8}$ cups of bubble mix, $\frac{35}{8}$ cups of water, $\frac{14}{8}$ cups of dish soap.
	   ○ **Rationale for Score:** The student provides the correct number of cups of bubble mix, water and dish soap needed to fill 7 bottles ($6\frac{1}{8}$ cups for 7 bottles, $\frac{35}{8}$ cups of water, dish soap I needed, $\frac{14}{8}$).
	Modeling Component:
	• **Student Response:** $(\frac{5}{8} \times 7) + (\frac{2}{8} \times 7) = \frac{49}{8} = 6\frac{1}{8}, \frac{5}{8} \times 7 = \frac{35}{8}, \frac{2}{8} \times 7 = \frac{14}{8}$.
	   ○ **Rationale for score:** The student provides valid work to find how many cups of bubble mix, water and dish soap is needed to fill 7 bottles [$(\frac{5}{8} \times 7) + (\frac{2}{8} \times 7) = \frac{49}{8} = 6\frac{1}{8}, \frac{5}{8} \times 7 = \frac{35}{8}, \frac{2}{8} \times 7 = \frac{14}{8}$].
	
	Note: Sample student responses are not representative of all correct answers for an item and are only provided as a guide to assist teachers with scoring.

ANSWER KEY: ITEM SET 3

Item Set 3 – Question 1 (Selected Response)

A store has two lamps for sale. Lamp A costs $9. Lamp B costs 6 times more than Lamp A.

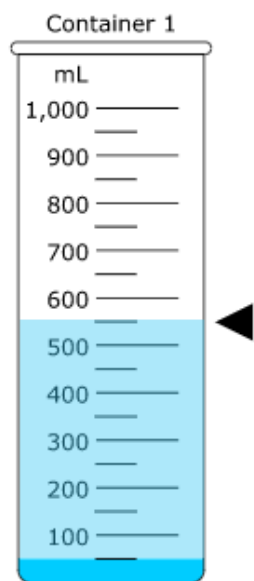How much is Lamp B?

- ○ A. $3
- ○ B. $15
- ○ C. $45
- ◉ D. $54

Item Information		
Answer	D	
Colorado Academic Standards (CAS) Evidence Outcome	4.OA.A.2	Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. (See Appendix, Table 2)
Evidence Statement	4.OA.2	Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. i) See 2020 CAS, Appendix: Table 2 ii) Tasks sample equally the situations in the third row of 2020 CAS, Appendix: Table 2.
Subclaim	A – Major Content	The student solves problems involving the Major Content for her grade/course with connections to the Standards for MathematicalPractice.
P Value	0.879	

Item Set 3 – Question 2 (TEI Slider)

A student has an unknown amount of water in Container 1. She pours the amount into Container 2, which already has 450 milliliters of water inside. After she combines the two amounts, there is a total of 1 liter of water in Container 2.

What was the original amount of water, in milliliters, in Container 1 before the student combined the two amounts?

Adjust the slider by dragging the top of the slider to the correct height.

Container 1

mL
1,000
900
800
700
600
500 ◀
400
300
200
100

Item Information		
Answer	See Image	
Colorado Academic Standards (CAS) Evidence Outcome	4.MD.A.2	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
Evidence Statement	4.MD.2-2	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, in problems involving simple fractions. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. i) Situations involve two measurements given in the same units, one a whole-number measurement and the other a non-whole-number measurement (given as a fraction).ii) Tasks may present number line diagrams featuring a measurement scale. iii) Tasks may include measuring distances to the nearest cm or mm. iv) Units of mass are limited to grams and kilograms. v) Task will not include division involving fractions.
Subclaim	B - Supporting Content	The student solves problems involving the Additional and Supporting Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	Not Available	

Item Set 3 – Question 3 (Fill in the Blank)

A person went on a hike that lasted 3 hours.

How many minutes was the hike?

Enter your answer into the box.

180

Item Information		
Answer	See Image	
Colorado Academic Standards (CAS) Evidence Outcome	4.MD.A.1	Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr., min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. For example, know that 1 ft is 12 times as long as 1 in.Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36)...
Evidence Statement	4.MD.1	Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36)...
Subclaim	B - Supporting Content	The student solves problems involving the Additional and Supporting Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	0.838	

A group of 63 birds is 9 times more than a group of 7 birds.

Which equation has the same meaning as this statement?

- ◉ A. $63 = 9 \times 7$
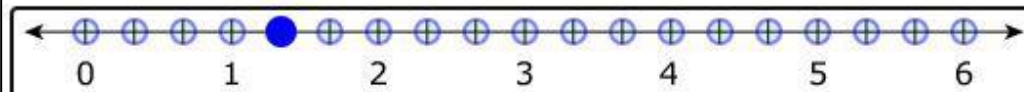
- ○ B. $7 = 63 \times 9$

- ○ C. $7 = 9 \div 63$

- ○ D. $63 = 7 \div 9$

Item Information		
Answer	A	
Colorado Academic Standards (CAS) Evidence Outcome	4.OA.A.1	Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.
Evidence Statement	4.OA.1-2	Represent verbal statements of multiplicative comparisons as multiplication equations. i) Tasks have "thin context" or no context.
Subclaim	A – Major Content	The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	0.743	

What number on the number line represents the value of $2 \times \frac{2}{3}$?

Select **one** place on the number line to plot the point.

Item Information		
Answer	See Image	
Colorado Academic Standards (CAS) Evidence Outcome	4.NF.B.4.a	Understand a fraction a/b as a multiple of 1/b. For example, use a visual fraction model to represent $\frac{5}{4}$ as the product 5 x $(\frac{1}{4})$, recording the conclusion by the equation $\frac{5}{4}$ = 5 x $(\frac{1}{4})$.
Evidence Statement	4.NF.4a	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. Understand a fraction a/b as a multiple of 1/b. For example, use a visual fraction model to represent $\frac{5}{4}$ as the product 5 x $(\frac{1}{4})$, recording the conclusion by the equation $\frac{5}{4}$ = 5 x $(\frac{1}{4})$. i) Tasks are limited to denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.
Subclaim	A - MajorContent	The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	Not Available	

Item Set 3 – Question 6 (Constructed Response)

Two friends each have a piece of yarn that is $\frac{2}{10}$ meter long.

Friend A says that $\frac{2}{10}$ meter is equivalent to $\frac{4}{12}$ meter because $\frac{2}{10} = \frac{2+2}{10+2} = \frac{4}{12}$.

Friend B says that $\frac{2}{10}$ meter is equivalent to $\frac{2}{5}$ meter because $\frac{2}{5} = \frac{2}{5 \times 2} = \frac{2}{10}$.

- Explain the mistake that Friend A made.
- Explain the mistake that Friend B made.
- Show a fraction that is equivalent in length to $\frac{2}{10}$ meter. Show or explain your work.

Enter your explanations and your answer in the space provided.

Item Information	
Answer	See Scoring Rubric and Sample Student Responses
Colorado Academic Standards (CAS) Evidence Outcome	4.NF.A.1 — Explain why a fraction $\frac{a}{b}$ is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
Evidence Statement	4.C.5-2 — Distinguish correct explanation/reasoning from that which is flawed, and – if there is a flaw in the argument – present corrected reasoning. (For example, some flawed 'student' reasoning is presented, and the task is to correct and improve it.) Content Scope: Knowledge and skills articulated in 4.NF.1. i) Tasks have "thin context" or no context. ii) Tasks are limited to denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. iii) Tasks may include fractions that equal whole numbers. Whole numbers are limited to 0 through 5.
Subclaim	C – Expressing Mathematical Reasoning — The student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others, and/or attending to precision when making mathematical statements.
Score Point Distribution	12.2% of students earned 4 points. 12.3% of students earned 3 points. 16.2% of students earned 2 points. 19.3% of students earned 1 point. 39.9% of students earned 0 points.

Scoring Rubric	
Points	**Attributes**
4	Student response includes each of the following 4 elements. • **Reasoning component**: Valid explanation of the mistake that Friend A makes. • **Reasoning component:** Valid explanation of the mistake that Friend B makes. • **Reasoning component:** Valid explanation or work to find a fraction equivalent in length to $\frac{2}{10}$ meter. • **Computation component**: Correct fraction equivalent in length to $\frac{2}{10}$ meter.
3	Student response includes 3 of the 4 elements.
2	Student response includes 2 of the 4 elements.
1	Student response includes 1 of the 4 elements.
0	Student response is incorrect or irrelevant.
Sample Student Response:	Equivalent fraction is $\frac{6}{30}$. The mistake friend A made was he did $\frac{2}{10}+\frac{2}{2}=\frac{4}{12}$ not $\frac{2}{10}\times\frac{2}{2}=\frac{4}{20}$. The mistake friend B made was he only multiplied the 5 in $\frac{2}{5}$ not both 2 and 5. My equivalent fraction is correct because $\frac{2}{10}\times\frac{3}{3}=\frac{6}{30}$.

Annotation for Sample Student Response:	**Score Point 4**
	The response receives full credit. It includes each of the 4 required elements.
	Reasoning Component:
	• **Student Response:** The mistake friend A made was he did $\frac{2}{10}+\frac{2}{2}=\frac{4}{12}$ not $\frac{2}{10}\times\frac{2}{2}=\frac{4}{20}$.
	    ○ **Rationale for Score:** The student provided a valid explanation of the mistake made by providing the incorrect addition used and then showing how to correct the mistake using multiplication (he did $\frac{2}{10}+\frac{2}{2}=\frac{4}{12}$ not $\frac{2}{10}\times\frac{2}{2}=\frac{4}{20}$).
	Reasoning Component:
	• **Student Response:** The mistake friend B made was he only multiplied the 5 in $\frac{2}{5}$ not both 2 and 5.
	    ○ **Rationale for score:** The student provided a valid explanation of the mistake made by identifying that both the numerator and denominator should be multiplied by the same number (he only multiplied the 5 in $\frac{2}{5}$ not both 2 and 5).
	Reasoning Component:
	• **Student Response:** My equivalent fraction is correct because $\frac{2}{10}\times\frac{3}{3}=\frac{6}{30}$.
	    ○ **Rationale for score:** The student provides valid work to determine a fraction equivalent to $\frac{2}{10}$ ($\frac{2}{10}\times\frac{3}{3}$).
	Computation Component:
	• **Student Response:** Equivalent fraction is $\frac{6}{30}$ . . . $\frac{2}{10}\times\frac{3}{3}=\frac{6}{30}$.
	    ○ **Rationale for score:** A correct fraction equivalent to $\frac{2}{10}$ is provided (Equivalent fraction $\frac{6}{30}$). Note that the fraction $\frac{6}{30}$ provided as a part of the work used to find an equivalent fraction would also be sufficient to receive credit for this element.
	Note: Sample student responses are not representative of all correct answers for an item and are only provided as a guide to assist teachers with scoring.

There are 3,726 students spending the summer at a camp. The students are divided equally into 9 groups.

How many students are in each group?

○ A. 302

◉ B. 414

○ C. 482

○ D. 512

Item Information		
Answer	B	
Colorado Academic Standards (CAS) Evidence Outcome	4.NBT.B.6	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
Evidence Statement	4.Int.4	Solve one-step word problems involving dividing a four-digit number by a one-digit number. i) The given numbers are such as to require a general strategy based on place value and the properties of operations (e.g., 2328 ÷ 8). ii) Quotients are whole numbers (i.e., there are no remainders). iii) Word problems shall include a variety of grade-level appropriate applications and contexts.
Subclaim	A – Major Content	The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value	0.677	

Create a fraction model with a denominator of 10 that is equivalent to $\frac{70}{100}$.

Divide the figure into the correct number of equal parts by using the More and Fewer buttons. Then shade by selecting the part or parts.

| Fewer | More | Reset |

Item Information		
Answer	See Image	
Colorado Academic Standards (CAS) Evidence Outcome	4.NF.A.1	Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
Evidence Statement	4.NF.1-2	Use the principal a/b = (n x a)/(n x b) to recognize and generate equivalent fractions. i) The explanation aspect of 4.NF.1 is not assessed here; for that aspect of the standard, see 4.C.4-1, 4.C.5-2, and 4.C.7-1. ii) Tasks are limited to denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. iii) Tasks may include fractions that equal whole numbers. Whole numbers are limited to 0 through 5.
Subclaim	A – Major Content	The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.