Colorado Measures of Academic Success

Grade 3 Math

Answer Key with Scoring Rubrics, Sample Responses & Annotations

Practice Resource for Students

1151698 1 2 3 4 5 A B C D E Printed in the USA ISD37553

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.

- Math
    - 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

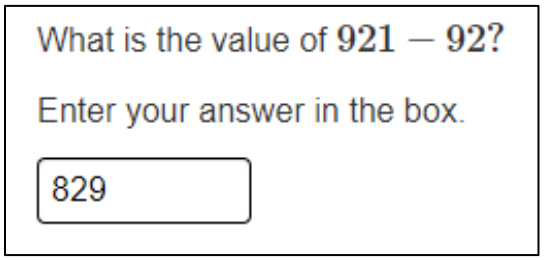
The score point distribution provides the percentage of students who scored at each possible score point for constructed response questions.

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

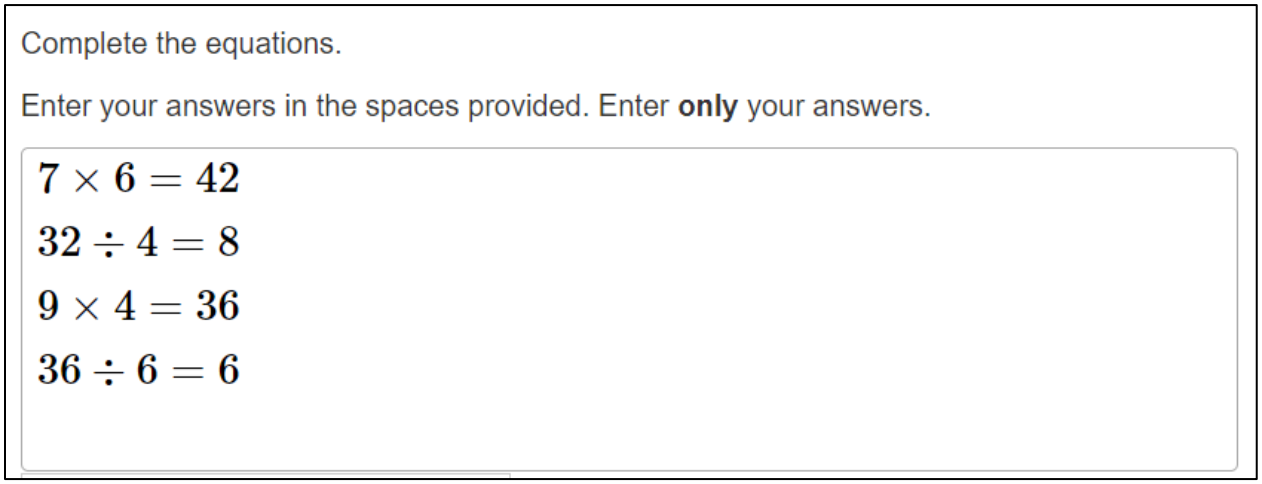
Item Set 1 - Question 1 (Fill in the Blank)



Item Information

- Answer – See Image
- Colorado Academic Standards (CAS) Evidence Outcomes – 3.NBT.A.2
    - Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
- Evidence Statement – 3.NBT.2
    - Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. i) Tasks have no context. ii) Tasks are not explicitly time.
- 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 – 0.414

Item Set 1 – Question 2 (Equation Editor)



Item Information

- Answer – See Image
- Colorado Academic Standards (CAS) Evidence Outcomes – 3.OA.C.7
    - Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.
- Evidence Statement – 3.OA.7-2
    - Fluently multiply and divide within 100. By the end of Grade 3, know from memory all products of two one-digit numbers. i) Tasks do not have a context. ii) Only the answer is required. Strategies, representations, etc. are not assessed here. iii) Tasks require finding of products and related quotients accurately. For example, each 1-point task might require four or more computations, two or more multiplication and two or more division. iv) 75% of tasks are from the harder three quadrants of the times table (a × b where a > 5 and/or b > 5). v) Tasks are not explicitly timed.
- 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 – 0.454

Item Set 1 – Question 3 (TEI Multiple Select)

Three shapes are listed in the table.

Select the boxes to show what is true for **each** shape.

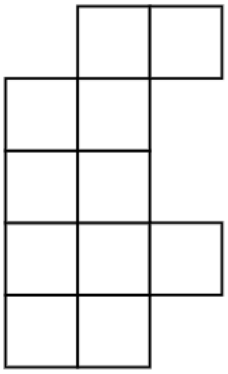
Shape	Is a Quadrilateral	Has More Than 5 Sides
rectangle	☑	☐
hexagon	☐	☑
square	☑	☐

Item Information

- Answer – See Image
- Colorado Academic Standards (CAS) Evidence Outcomes – 3.G.A.1
    - Explain that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.
- Evidence Statement – 3.G.1
    - Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories. i) A trapezoid is defined as "A quadrilateral with at least one pair of parallel sides."
- 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 – 0.727

Item Set 1 – Question 4 (Fill in the Blank)

A figure is made up of squares.



☐ = 1 square centimeter

What is the area, in square centimeters, of the figure?

Enter your answer in the box.

11

Item Information

- Answer – See Image
- Colorado Academic Standards (CAS) Evidence Outcomes – 3.MD.C.6
  - Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).
- Evidence Statement – 3.MD.6
  - Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).
- 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 – 0.778

Item Set 1 – Question 5 (TEI Drag and Drop)

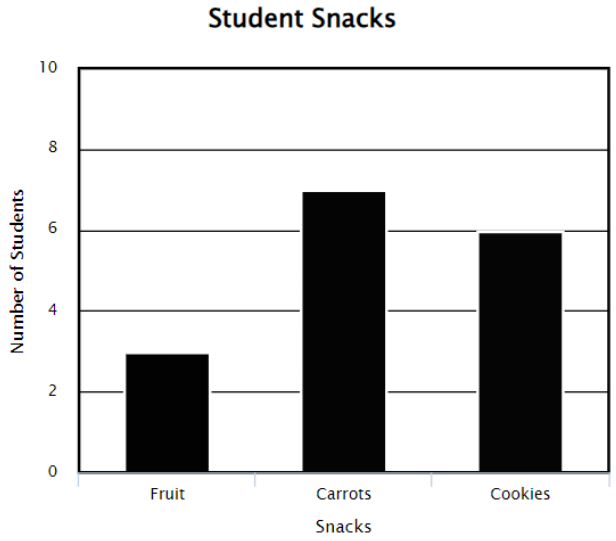
After practice, 16 students had a snack. The table shows how many students chose each snack. The number of students who chose cookies is missing.

Student Snacks

Snacks	Number of Students
fruit	3
carrots	7
cookies	?

Find how many students chose cookies. Then, use the table to create a graph.

Drag the top of each bar to the correct height.



Item Information

- Answer – See Image
- 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.
- Evidence Statement – 3.MD.3-1
    - Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. For example, draw a bar graph in which each square in the bar graph might represent 5 pets. i) Tasks involve no more than 10 items in 2-5 categories. ii) Categorical data should not take the form of a category that could be represented numerically (e.g., ages of students). iii) Tasks do not require students to create the entire graph, but might ask students to complete a graph or otherwise demonstrate knowledge of its creation.
- 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 – 0.564

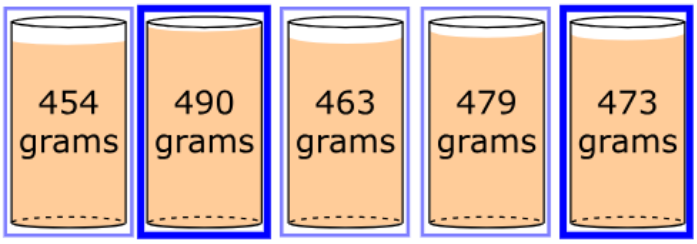
Item Set 1 – Question 6 (Multiple Select)

Part A

A student measures the mass of 2 jars of sand. The total mass of the 2 jars of sand is 963 grams.

Which two jars of sand have a total mass of 963 grams?

Select the **two** correct jars.



Part B

The student also has jars of rocks that have a total mass of 300 grams.

Which group of jars could the student have?

Select the **two** answers that are correct.

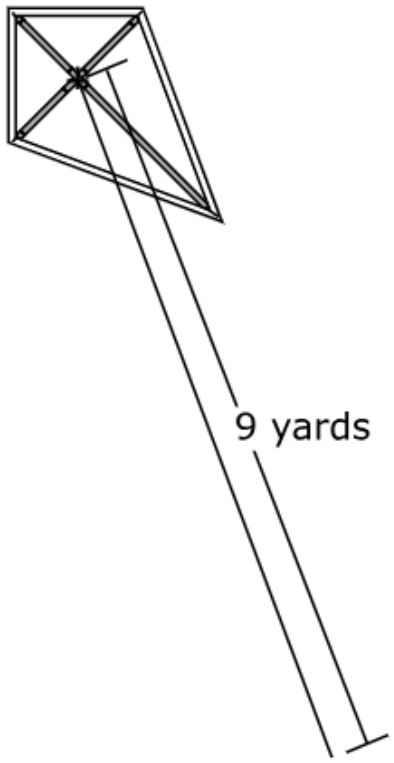
- [ ] A. 7 jars, each with a mass of 40 grams
- [x] B. 6 jars, each with a mass of 50 grams
- [x] C. 5 jars, each with a mass of 60 grams
- [ ] D. 4 jars, each with a mass of 80 grams
- [ ] E. 3 jars, each with a mass of 10 grams

Item Information

- Part A Answer – See Image
- Part B Answer – B, C
- Colorado Academic Standards (CAS) Evidence Outcomes
    - 3.MD.A.2 – Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). (This excludes compound units such as cm3 and finding the geometric volume of a container.) Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (This excludes multiplicative comparison problems, such as problems involving notions of "times as much." See Appendix, Table 2.)
    - 3.NBT.A.2 – Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
    - 3.NBT.A.3 – Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.
- Evidence Statement – 3.Int.5
    - Add, subtract, or multiply to solve a one-step word problem involving masses or volumes that are given in the same units, where a substantial addition, subtraction, or multiplication step is required drawing on knowledge and skills articulated in 3.NBT, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. Content Scope: 3.MD.2, 3.NBT.2, and 3.NBT.3 i) Tasks must be aligned to the first standard and 1 or more of the subsequent standards listed in the content scope. Substantial (def.) - Values should be towards the higher end of the numbers identified in the standards.
- 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 – 0.336

Item Set 1 – Question 7 (Fill in the Blank)

A student wants to make some kites. Each kite needs 9 yards of string.



How many yards of string will the student need to make 4 kites?

Enter your answer in the box.

36

Item Information

- Answer – See Image
- Colorado Academic Standards (CAS) Evidence Outcomes – 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 – 3.OA.3-2
    - Use multiplication within 100 (both factors less than or equal to 10) to solve word problems in situations involving measurement quantities other than area, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. i) All products come from the harder three quadrants of the times table (a x b where a > 5 and/or b > 5). ii) Tasks involve multiplying to find a total measure (other than area). iii) For more information see 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 Mathematical Practice.
- P Value – 0.684

Item Set 1 – Question 8 (TEI Drag and Drop; Constructed Response)

A person is buying clothing for her family. She is buying 3 hats, 1 scarf, and 4 belts. The table shows the price of each piece of clothing.

Price of Clothing

Clothing	Price
Hat	$8
Scarf	$10
Belt	$6

Part A

Write an equation to show the cost of buying 3 hats.

Drag and drop the numbers into each box. Each number may be used once, more than once, or not at all.

5 6 8 10 11 18 24 60 80

$3 \times$ [8] $=$ [24]

Part B

The person has a total of $100 to spend on the hats, scarves, and belts.

- Find the total cost of 7 hats, 1 scarf, and 4 belts.
- Explain or show how to find how much money the person will have left over.
- What is the total amount of money left over?

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

Item Information

- Part A Answer – See Image
- Part B Answer – See Sample Student Responses and Scoring Rubric
- Colorado Academic Standards (CAS) Evidence Outcomes
    - 3.OA.D.8 – Solve two-step word problems using the four operations. 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. (This evidence outcome is limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order of operations when there are no parentheses to specify a particular order.)
    - 3.OA.C.7 – Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.
- Evidence Statement – 3.D.1
    - Solve multi-step contextual word problems with degree of difficulty appropriate to Grade 3, requiring application of knowledge and skills articulated in Type I, Sub-Claim A Evidence Statements. i) Tasks may have scaffolding if necessary in order to yield a degree of difficulty appropriate to Grade 3. 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
    - 13.5% of students earned 3 points.
    - 15.7% of students earned 2 points.
    - 40.8% of students earned 1 point.
    - 29.9% of students earned 0 point.

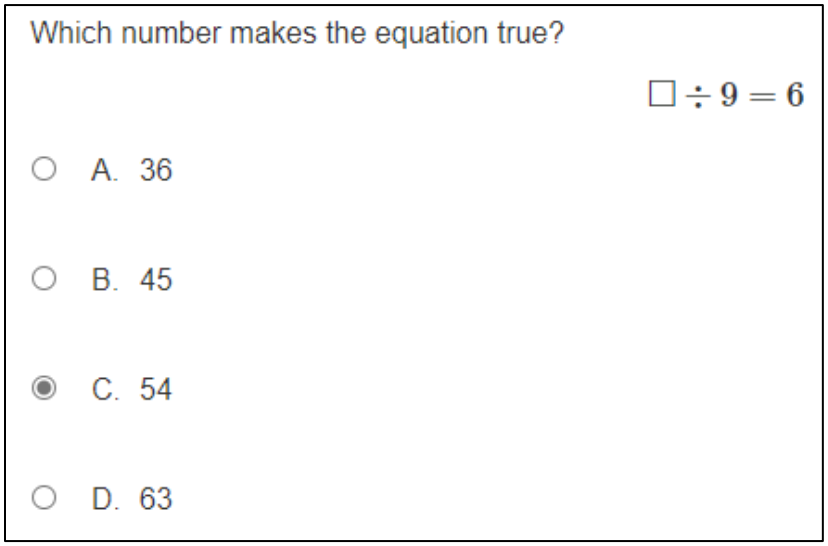
Scoring Rubric – Part A

Points	Attributes
1	Student response completes the equation $3 \times 8 = 24$
0	Student response is incorrect.

Scoring Rubric – Part B

Points	Attributes
2	Student response includes the following 2 elements. • **Modeling component** = 1 point: The student explains or shows the process for finding the amount of money the person should get back. • **Computation component** = 1 point: The student provides a response of $10. Sample Student Response: "7 × 8 = 56, 6 × 4 = 24, so 56 + 10 + 24 = 90. 100 – 90 = 10. She would get $10 back." Notes: • Explanations will vary depending on the steps used to find the amount of money the person should get back. The student can still earn credit for the modeling component if all of the steps are included in one equation, as long as it is true. For example, "The person would get back $10 because 100 − (56 + 10 + 24) = 10."
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.
Sample Student Response:	Sample Solution 1: 7 x 8 = 56 1 x 10 = 10 6 x 4 = 24 56 + 10 + 24 = $90 to buy 7 hats, 1 scarf, and 4 belts. To find the amount of money the person has left over, you do 100 – 90 = 10. The total amount of money the person has left over is $10.
Annotation for Sample Student Response:	Solution 1, Score Point 2 The response receives full credit. It includes each of the two required elements. Modeling Component: • **Student Response:** 7 x 8 = 56, 1 x 10 = 10, 6 x 4 = 24, 56 + 10+ 24 = $90, 100 – 90 = 10 ○ **Rationale for Score:** Valid explanation and work to find the amount of money the person will have left over is provided (7 x 8 = 56, 1 x 10 = 10, 6 x 4 = 24, 56 + 10+ 24 = $90 to buy 7 hats, 1 scarf, and 4 belts. To find the amount of money the person has left over, you do 100 – 90 = 10). The students shows a valid process of adding the costs of the purchased items, 90, and then correctly subtracting that total from the 100 dollars to find the amount left over, 10. Computation Component: • Student Response: $10 ○ **Rationale for score:** Correct total amount of money, in dollars, left over is provided ($10). Note that the unit label of dollar is given in the prompt, so the dollar sign or label of 'dollar' is not required on the student answer. **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 9 (Selected Response)



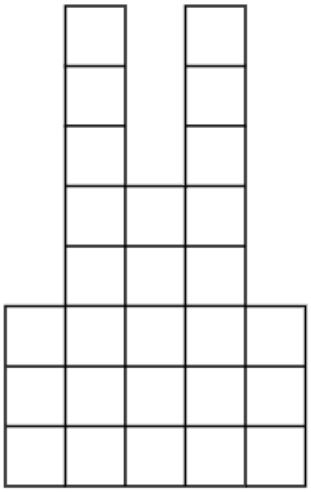
Item Information

- Answer – C
- Colorado Academic Standards (CAS) Evidence Outcomes – 3.OA.A.4
    - Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 x ? = 48, 5 = box ÷ 3, 6 x 6 = ?
- Evidence Statement – 3.OA.4
    - Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = ? ÷ 3, 6 × 6 = ?. i) Tasks do not have a context. ii) Only the answer is required. Strategies, representations, etc. found in 3.OA.7 are not assessed here. iii) All products and related quotients are from the harder three quadrants of the times table (a × b where a > 5 and/or b > 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 – 0.598

Item Set 1 – Question 10 (Constructed Response)

A preschool teacher uses square carpet tiles for a play area in the classroom. The figure shows how the carpet tiles are placed on the floor.

Play Area



KEY
Area of ☐ = 1 square foot.

- What is the total area of the figure?
- Show or explain how you found the total area of the figure.
- Write a multiplication equation for a figure that has the same area.

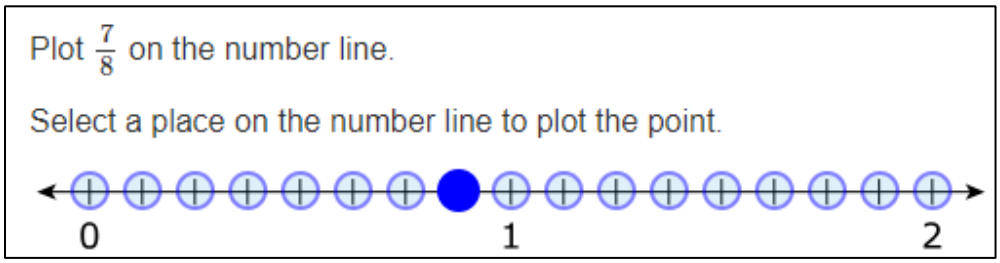
Enter your answers and your work or explanation in the space provided.

Item Information

- Answer – See Scoring Rubric and Sample Student Responses
- Colorado Academic Standards (CAS) Evidence Outcomes
  - 3.MD.C.7.d – Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.
  - 3.MD.C.7.a – Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.
- Evidence Statement – 3.C.1-3
  - Base explanations/reasoning on the properties of operations. Content Scope: Knowledge and skills articulated in 3.MD.7. i) Pool should contain tasks with and without contexts. ii) Students need not use technical terms such as commutative, associative, distributive, or property.
- 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
  - 11.5% of students earned 3 points.
  - 31.1% of students earned 2 points.
  - 18.2% of students earned 1 point.
  - 39.1% of students earned 0 point.

Points	Attributes
3	Student response includes the following 3 elements. • **Reasoning component** = 1 point: The student shows or explains how to find the total area of the play area. • **Computation component** = 1 point: The student provides the total area, 27 square feet. • **Reasoning component** = 1 point: The student shows or explains how to rearrange the tiles in the figure so that the total area can be found using multiplication or a combination of multiplication or addition. Sample Student Response: "The total area is made up of 3 rectangles. The area of the first rectangle is 15 square feet because there are 15 squares that have an area of 1 square foot. The area of the second and third rectangles are 6 square feet each because there are 6 squares in each rectangle. When I add $15 + 6 + 6$, I get 27 square feet for the total area. To find the area using multiplication, I can lay the carpet tiles in 9 rows with 3 carpet tiles in each row. This will make one rectangle with an area of $9 \times 3 = 27$ square feet." Notes: • It is not necessary for the student to include the names of any properties of operations when describing the effect of moving carpet tiles. • Explanations will vary depending on the method used to calculate the total area. The student can describe the area using equations, by counting tiles, or by any other method as long as the reasoning is valid.
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 total area of the figure is 27 sq. ft. I know this answer is correct because $3 \times 5 = 15$ is the area of the bottom square. Then I multiplied $2 \times 3 = 6$ to find the area of the second rectangle. $6 + 15 = 21$. Then I added $3 + 3 = 6$ to find the area of the top rectangles. $6 + 21 = 27$. A multiplication equation could be $9 \times 3 = 27$.
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:** $3 \times 5 = 15$ is the area of the bottom square. Then I multiplied $2 \times 3 = 6$ to find the area of the second rectangle. $6 + 15 = 21$. Then I added $3 + 3 = 6$ to find the area of the top rectangles. $6 + 21 = 27$. ○ **Rationale for Score:** Valid work and explanation are provided for how to find the total area of the play area ($3 \times 15 = 15$ is the area of the bottom square. Then I multiplied $2 \times 3 = 6$ to find the area of the 2nd rectangle. $6 + 15 = 21$. Then I added $3 + 3 = 6$ to find the area of the top rectangles. $6 + 21$ is 27). Computation Component: • Student Response: 27 sq. ft. ○ **Rationale for score:** The correct total area, in square feet, of the play area is provided (27 sq. ft.). Note that a correct unit label is given, however, the label, square feet, is given in the prompt, so is not required on the student answer. Reasoning Component: • Student Response: $9 \times 3 = 27$ ○ **Rationale for score:** A valid multiplication equation for a figure that has the same areas as the play area is provided ($9 \times 3 = 27$). For a valid equation it must show the relationship between two quantities and must include an equal sign or state 'equals' between the two quantities to receive credit. **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 11 (TEI Hot Spot)



Item Information

- Answer – See Image
- Colorado Academic Standards (CAS) Evidence Outcomes – 3.NF.A.2
    - Describe a fraction as a number on the number line; represent fractions on a number line diagram.
- Evidence Statement – 3.NF.2
    - Understand a fraction as a number on the number line; represent fractions on a number line diagram. a. Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line. b. Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line. i) Fractions may include values greater than 1. ii) Fractions equivalent to whole numbers are limited to 0 through 5. iii) Fractions equal whole numbers in 20% of these tasks. iv) Tasks have “thin context” or no context. “Thin context” is a sentence or phrase that establishes a concrete referent for the quantity/quantities in the problem, in such a way as to provide meaningful avenues for mathematical intuition to operate, yet without any sort of further analysis of the context. For example, a task could provide a reason for being given a set of fractional measurements such as, (“The fractions represent lengths of ribbon.”) v) Tasks are limited to fractions with denominators 2, 3, 4, 6, and 8.
- 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 – 0.456

Item Set 1 - Question 12 (Selected Response)

Part A

A store has a parking lot. There are 6 rows of parking spaces in the parking lot. There are 8 parking spaces in each row.

There are 19 cars parked in the parking lot.

How many parking spaces in the parking lot are empty?

- (●) A. 29
- ( ) B. 35
- ( ) C. 48
- ( ) D. 67

Part B

Another store has a parking lot with 9 rows of parking spaces. Each row has the same number of parking spaces. There are a total of 90 parking spaces. There are only 2 cars parked in each row.

How many parking spaces in each row are empty?

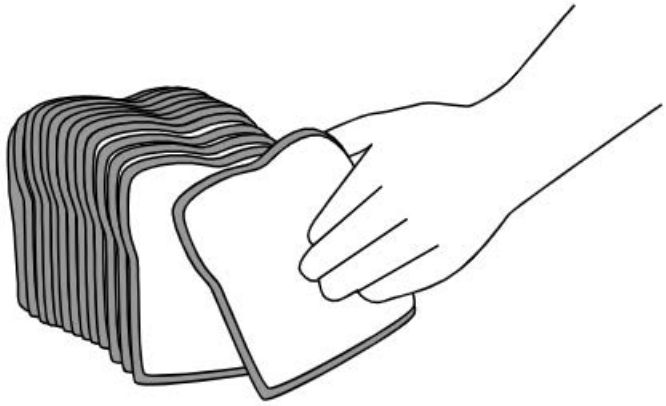
- ( ) A. 7
- (●) B. 8
- ( ) C. 9
- ( ) D. 10

Item Information

- Part A Answer – A
- Part B Answer – B
- Colorado Academic Standards (CAS) Evidence Outcomes - 3.OA.D.8
    - Solve two-step word problems using the four operations. 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. (This evidence outcome is limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order of operations when there are no parentheses to specify a particular order.)
- Evidence Statement – 3.OA.8
    - Solve two-step word problems using the four operations. 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. i) 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. ii) 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. iii) 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.) iv) If scaffolded, one of the 2 parts must require 2-steps. The other part many consist of 1-step. v) Conversions should be part of the 2-steps and should not be a step on its own. vi) If the item is 2 points, the item should be a 2 point, unscaffolded item but the rubric should allow for 2-1-0 points.
- 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 – 0.46

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

A package of bread has a mass of 623 grams. One slice of bread is removed from the package. The slice of bread has a mass of 55 grams.



What is the mass, in grams, of the package of bread after the slice of bread is removed?

Enter your answer in the box.

568

Item Information

- Answer – See Image
- Colorado Academic Standards (CAS) Evidence Outcomes – 3.MD.A.2
    - Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). (This excludes compound units such as cm3 and finding the geometric volume of a container.) Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (This excludes multiplicative comparison problems, such as problems involving notions of “times as much.” See Appendix, Table 2.)
- Evidence Statement – 3.MD.2-2
    - Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. i) Only the answer is required (methods, representations, etc. are not assessed here). ii) Units of grams (g), kilograms (kg), and liters (l).
- 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 – 0.386

ANSWER KEY: ITEM SET 2

Item Set 2 - Question 1 (Selected Response)

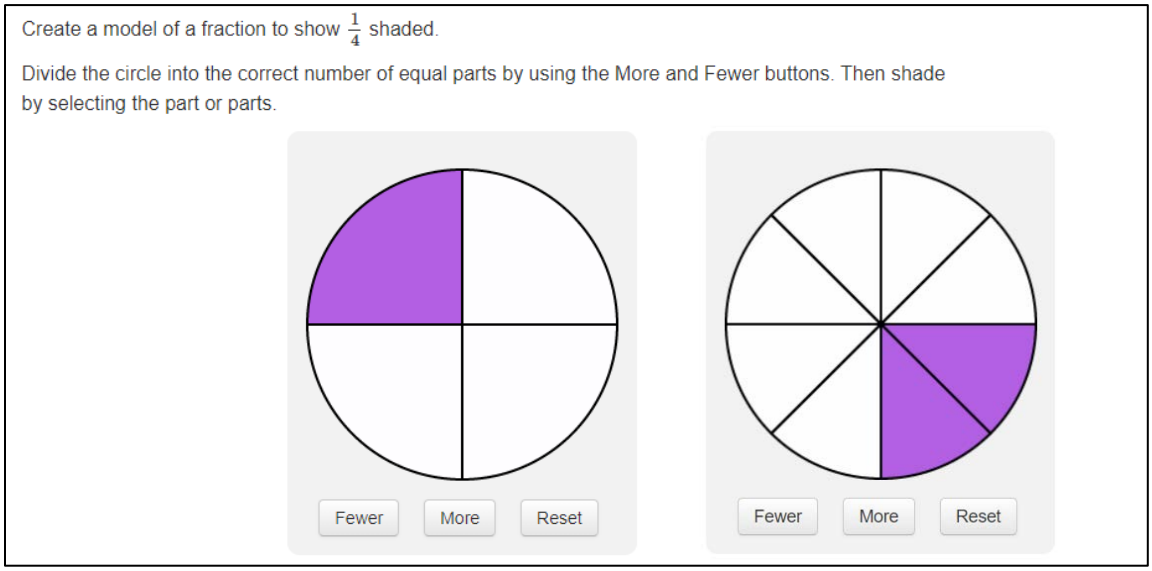
What is the value of 6×80?

- A. 360
- B. 420
- C. 480 (selected)
- D. 490

Item Information

- Answer – C
- Colorado Academic Standards (CAS) Evidence Outcomes – 3.NBT.A.3
  - Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.
- Evidence Statement – 3.NBT.3
  - Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.
- 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 – 0.644

Item Set 2 – Question 2 (TEI)



Item Information

- Answer – See Image Examples. Note: other valid approaches are acceptable
- Colorado Academic Standards (CAS) Evidence Outcomes – 3.G.A.2
    - Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.
- Evidence Statement – 3.G.2
    - Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.
- 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 – 0.903

Item Set 2 – Question 3 (Selected Response)

There are 8 people. They each have 4 oranges.

Which expression shows how many oranges the people have altogether?

- A. $8 + 4$
- B. $8 - 4$
- C. 8×4
- D. $8 \div 4$

Item Information

- Answer – C
- Colorado Academic Standards (CAS) Evidence Outcomes – 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.
- Evidence Statement – 3.OA.1
  - Use multiplication within 100 (both factors less than or equal to 10) to solve word problems in situations involving equal groups, arrays, or area, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
- 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 – 0.761

Item Set 2 – Question 4 (Multiple Select, TEI Drag and Drop, Constructed Response)

A teacher and her class collected books.

- Group A collected 334 books.
- Group B collected 407 books.
- The teacher collected 26 books.

Part A

Which comparison correctly compares the number of books collected?

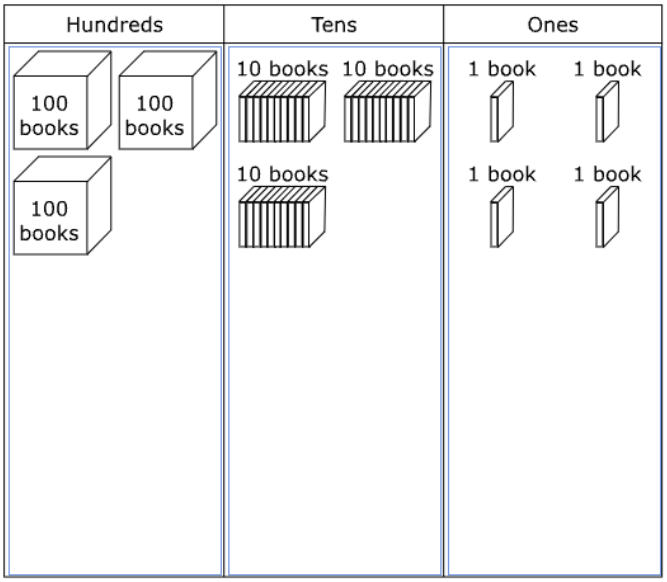
Select the **three** correct comparisons.

- [ ] A. $407 < 334$
- [ ] B. $26 > 407$
- [x] C. $26 < 334$
- [x] D. $407 > 334$
- [x] E. $26 < 407$
- [ ] F. $26 > 334$

Part B

Place the correct number of 100s, 10s, and 1s to show the total amount of books Group A collected.

Drag and drop each 100s, 10s, and 1s into the correct space. Each item may be used once, more than once, or not at all.



Part C

A bookstore gave the class an additional 32 books. The teacher placed all the books together.

- Write an equation or equations that could be used to find the total number of books, including the books from the bookstore.
- Include the total number of books.
- Write the total number of books collected in expanded form.
- Explain or show how many groups of 100s, 10s, and 1s of books the teacher would have after placing all the books together.

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

Item Information

- Part A Answer – C, D, E
- Part B Answer – See Image, 3 hundreds (100s), 3 tens (10s), and 4 ones (1s).
- Part C Answer – See Scoring Rubric and Student Responses
- Colorado Academic Standards (CAS) Evidence Outcomes
    - 2.NBT.A.4 – Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.
    - 2.NBT.A.3 – Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
- Evidence Statement – 3.D.2
    - Solve multi-step contextual problems with degree of difficulty appropriate to Grade 3, requiring application of knowledge and skills articulated in 2.OA.A, 2.OA.B, 2.NBT, and/or 2.MD.B.
- 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
    - 5.8% of students earned 5 points.
    - 13.1% of students earned 4 points.
    - 12.0% of students earned 3 points.
    - 19.3% of students earned 2 points.
    - 25.6% of students earned 1 point.
    - 21.9% of students earned 0 points.

Scoring Rubric – Part A

Points	Attributes
1	**Computation Component:** Student provides the three correct comparisons: Selects C. 26 < 334 Selects D. 407 >334 Selects E. 26 < 407
0	Student response is incorrect.

Scoring Rubric – Part B

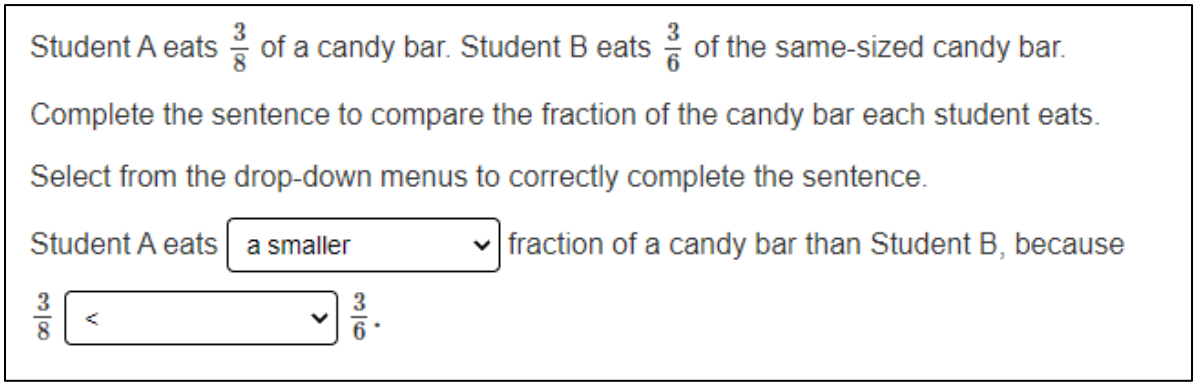
Points	Attributes
1	**Computation Component:** Student provides the correct number of 100s, 10s, 1s: Hundreds column: 3 blocks of 100 books Tens column: 3 blocks of 10 books Ones column: 4 blocks of 1 book
0	Student response is incorrect.

Scoring Rubric – Part C

Points	Attributes
4	Student response includes each of the following 4 elements. • **Modeling component**: The student provides a valid equation or equations that model the total number of books, including the books from the bookstore. • **Computation component**: Correct total number of books collected, including the books from the bookstore, 799. • **Modeling component**: The student writes the total number of books collected in valid expanded form. • **Computation component**: The student explains or show how many groups of 100's, 10's, and 1's are in the total number of books collected.
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:	334 + 407 = 741, 741 + 26 = 767, 767 + 32 = 799. The total amount of books is 799. 700 + 90 + 9 = 799. The teacher would have 7 hundreds, 9 tens, and 9 ones.

Annotation for Sample Student Response:	Score Point 4
	The response receives full credit. It includes each of the four required elements.
	Modeling Component:
	• **Student Response:** 334 + 407 = 741, 741 + 26 = 767, 767 + 32 = 799.
	  ○ **Rationale for Score:** The student provides valid equations that model the total number of books, including the books from the bookstore (334 + 407 = 741, 741 + 26 = 767, 767 + 32 = 799).
	Computation Component:
	• **Student Response:** The total amount of books is 799.
	  ○ **Rationale for score:** The correct total number of books collected, including the books from the bookstore is provided (799).
	Modeling Component:
	• **Student Response:** 700 + 90 + 9 = 799.
	  ○ **Rationale for Score:** The student writes the total number of books collected in valid expanded form (700 + 90 + 9).
	Computation Component:
	• **Student Response:** The teacher would have 7 hundreds, 9 tens, and 9 ones.
	  ○ **Rationale for score:** The student explains how many groups of 100's, 10's, and 1's are in the total number of books collected (7 hundreds, 9 tens, and 9 ones).
	
	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 2 – Question 5 (TEI Inline Choice)

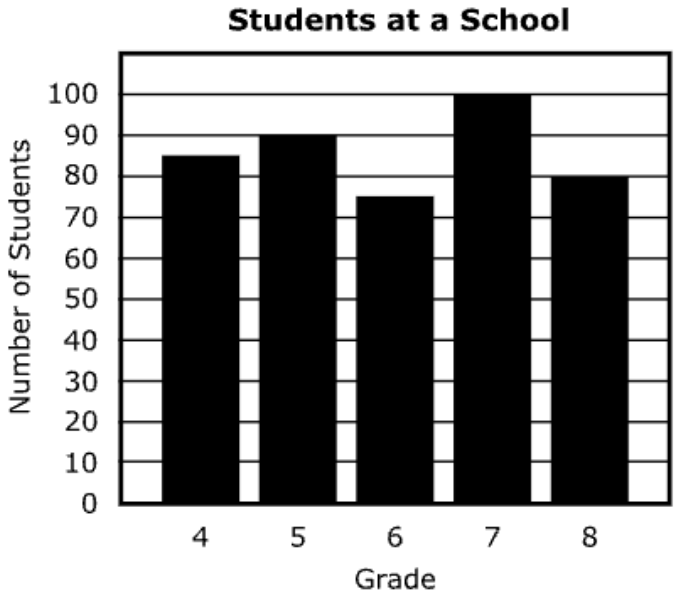


Item Information

- Answer – See Image
- Colorado Academic Standards (CAS) Evidence Outcomes – 3.NF.A.3.d
    - Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <.
- Evidence Statement – 3.NF.3d
    - Explain equivalence of fractions in special cases and compare fractions by reasoning about their size. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.
- 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 – 0.529

Item Set 2 – Question 6 (Fill in the Blank, Selected Response)

The bar graph shows the number of students in each grade at a school.



Part A

How many more students are in grade 7 than are in grade 4?

Enter your answer in the box.

15

Part B

How many more students are in grade 5 and grade 8 together than are in grade 6?

- A. 115
- B. 105
- C. 95
- D. 85

Item Information

- Part A Answer – See Image
- Part B Answer – C
- 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.
    - 3.NBT.A.2 – Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
- Evidence Statement – 3.Int.4
    - Use information presented in a scaled bar graph to solve a two-step "how many more" or "how many less" problem requiring a substantial addition, subtraction, or multiplication step, drawing on knowledge and skills articulated in 3.NBT. Content Scope: 3.MD.3, 3.NBT.2, and 3.NBT.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 – 0.51

Item Set 2 – Question 7 (Selected Response)

A total of 80 books were sent to 8 schools. Each school gets the same number of books.

How many books does each school get?

- A. 8
- B. 9
- C. 10
- D. 11

Item Information

- Answer – C
- Colorado Academic Standards (CAS) Evidence Outcomes – 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.
- Evidence Statement – 3.OA.3-3
  - Use division within 100 (quotients related to products having both factors less than or equal to 10) to solve word problems in situations involving equal groups, arrays, or area, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
- 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 – 0.856

Item Set 2 – Question 8 (Constructed Response)

There are 309 third graders at a school.

There are 412 fourth graders at the same school.

A student wants to find how many more fourth graders there are than third graders.

The student says that there are 117 more fourth graders than third graders. The student's reasoning is that subtraction gives $9 - 2 = 7$ in the ones place, $1 - 0 = 1$ in the tens place, and $4 - 3 = 1$ in the hundreds place.

- Explain the mistake in the student's reasoning.
- Explain how to correct the mistake. Include the answer in your explanation.
- Find the total number of third and fourth graders. Show your work.

Enter your explanations, your answers, and your work in the space provided.

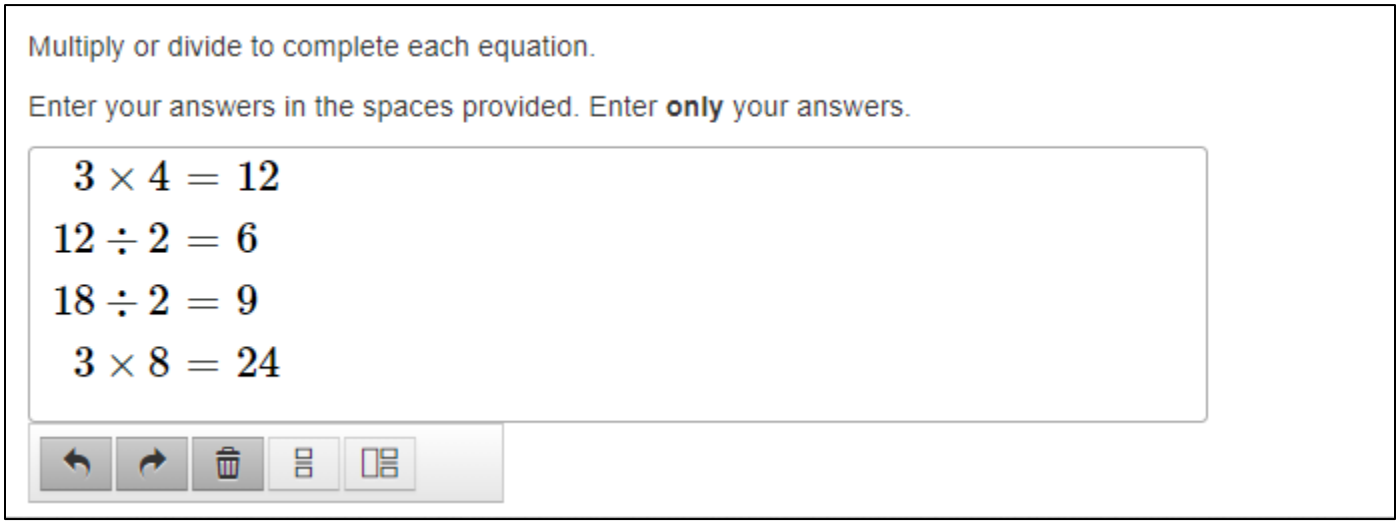
Item Information

- Answer – See Scoring Rubric and Sample Student Responses
- Colorado Academic Standards (CAS) Evidence Outcomes – 2.NBT.B.7
    - Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones, and ones; and sometimes it is necessary to compose or decompose tens or hundreds.
- Evidence Statement – 3.C.4-7
    - 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 2.NBT.
- 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
    - 0.9% of students earned 4 points.
    - 4.2% of students earned 3 points.
    - 15.1% of students earned 2 points.
    - 28.6% of students earned 1 point.
    - 51.2% of students earned 0 points.

Points	Attributes
4	Student response includes each of the following 4 elements. • **Reasoning component**: Valid explanation of the mistake in student's reasoning • **Reasoning component:** Valid explanation of how to correct the mistake; including the correct difference in number of third and fourth grade students, 103 • **Reasoning component:** Valid explanation or work to find the total number of third and fourth grade students • **Computation component**: Correct total number of third and fourth grade students, 721
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:	Sample Solution 1: The mistake in the student's reasoning is that in the one's place they subtracted 9 – 2 = 7 instead of 2 – 9. In order to fix the mistake, you must use regrouping instead of just reversing the equation. The student can regroup 1 tens and 2 ones to make 0 tens and 12 ones. Then, the student can do 12 – 9 = 3, then move to the tens place and do 0 – 0 = 0. Finally, you go to the hundreds place and do 4 – 3 = 1. There are 103 more 4^{th} grades than 3^{rd} graders, 412 – 309 = 103. The total number of third and fourth graders is 721. 309 + 412 = 721.
Annotation for Sample Student Response:	Solution 1, Score Point 4 The response receives full credit. It includes each of the 4 required elements. Reasoning Component: • **Student Response:** The mistake in the student's reasoning is that in the one's place they subtracted 9 – 2 = 7 instead of 2 – 9. ○ **Rationale for Score:** The student provided a valid explanation of the mistake made by identifying the incorrect reversed subtraction in the one's place (9 – 2 = 7) as compared to the correct order of subtraction (instead of 2 – 9). Reasoning Component: • **Student Response:** In order to fix the mistake, you must use regrouping instead of just reversing the equation. The student can regroup 1 tens and 2 ones to make 0 tens and 12 ones. Then, the student can do 12 – 9 = 3, then move to the tens place and do 0 – 0 = 0. Finally, you go to the hundreds place and do 4 – 3 = 1. There are 103 more 4^{th} graders than 3^{rd} graders, 412 – 309 = 103. ○ **Rationale for score:** The student provided a valid explanation of how to correct the mistake made by identifying that you must use regrouping and then showing how to find the correct difference by regrouping from the ten's place to the one's place (In order to fix the mistake, you must use regrouping instead of just reversing the equation . . . student can regroup 1 tens and 2 ones to make 0 tens and 12 ones. Then, the student can do 12 – 9 = 3, then move to the tens place and do 0 – 0 = 0. Finally, you go to the hundreds place and do 4 – 3 = 1. There are 103 more 4^{th} graders than 3^{rd} graders). Reasoning Component: • Student Response: 309 + 412 = 721. ○ **Rationale for score:** The student provides valid work to find the total number of third and fourth grade students (309 + 412 = 721). Computation Component: Student Response: 721. ○ **Rationale for score:** A correct total number of third and fourth grade students is provided (721). **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 2 – Question 9 (Equation Editor)

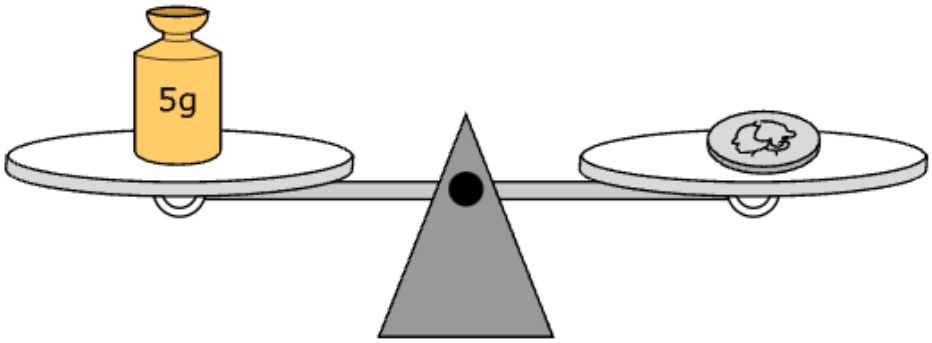


Item Information

- Answer – See Image
- Colorado Academic Standards (CAS) Evidence Outcomes – 3.OA.C.7
    - Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.
- Evidence Statement – 3.OA.7-1
    - Fluently multiply and divide within 25. By end of grade 3, know from memory all products of two one-digit numbers.
- 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 – 0.647

Item Set 2 – Question 10 (Fill in the Blank)

One side of a scale holds grams, and the other side of the scale holds a coin. The scale is balanced.



What is the mass, in grams, of 9 coins?

Enter your answer in the box.

45

Item Information

- Answer – See Image
- Colorado Academic Standards (CAS) Evidence Outcomes – 3.MD.A.2
    - Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). (This excludes compound units such as cm^3 and finding the geometric volume of a container.) Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.
- Evidence Statement – 3.MD.2-2
    - Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.
- 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 – 0.614

ANSWER KEY: ITEM SET 3

Item Set 3 - Question 1 (TEI Drag and Drop)

Find the missing length, width, or perimeter for each rectangle in the table.

Drag and drop a number into each blank.

7 12 13

	Length (inches)	Width (inches)	Perimeter (inches)
Rectangle A	4	3	14
Rectangle B	2	8	20
Rectangle C	3	5	16

Item Information

- Answer – See Image
- Colorado Academic Standards (CAS) Evidence Outcomes – 3.MD.D.8
    - Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.
- Evidence Statement – 3.MD.8
    - Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.
- 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 – 0.169

Item Set 3 - Question 2 (TEI Drag and Drop, Constructed Response)

A teacher is making a rectangular reading space for students in a classroom.

Part A

There are three different ways the teacher can make the reading space. The table is missing some of the information needed.

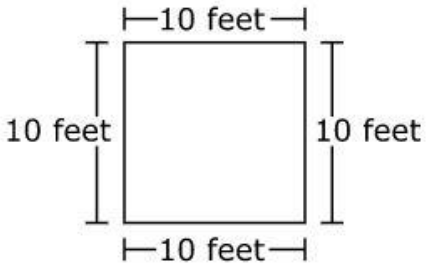
Drag and drop a number into each spot on the table. Each number may be used once, more than once, or not at all.

4 7 8 13 27 42

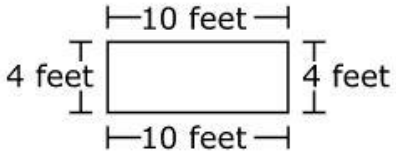
	Length (feet)	Width (feet)	Area (square feet)
Reading Space 1	4	9	36
Reading Space 2	7	6	42
Reading Space 3	8	8	64

Part B

The students make two different drawings of a reading space. The students think each reading space has an area of 40 square feet.



Drawing 1



Drawing 2

- Explain whether each drawing shows an area of 40 square feet.
- Explain a different way the reading space can have an area of 40 square feet.

Enter your explanations in the space provided.

Item Information

- Answer – See Scoring Rubric and Sample Student Responses
- Colorado Academic Standards (CAS) Evidence Outcomes – 3.MD.C.7.b
    - Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems and represent whole-number products as rectangular areas in mathematical reasoning.
- Evidence Statement – 3.C.3-2
    - Base explanations/reasoning on concrete referents such as diagrams (whether provided in the prompt or constructed by the student in her response). Content Scope: Knowledge and skills articulated in 3.MD.5, 3.MD.6, 3.MD.7. i) Pool should contain tasks with and without contexts. ii) Tasks with a context may present realistic or quasi-realistic images of a contextual situation (e.g., a drawing of a meadow). However, tasks do not provide the sort of abstract drawings that help the student to represent the situation mathematically (e.g., a tiling of the meadow).
- 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
    - 5.2% of students earned 3 points.
    - 13.8% of students earned 2 points.
    - 29.7% of students earned 1 point.
    - 51.2% of students earned 0 points.

Scoring Rubric – Part A

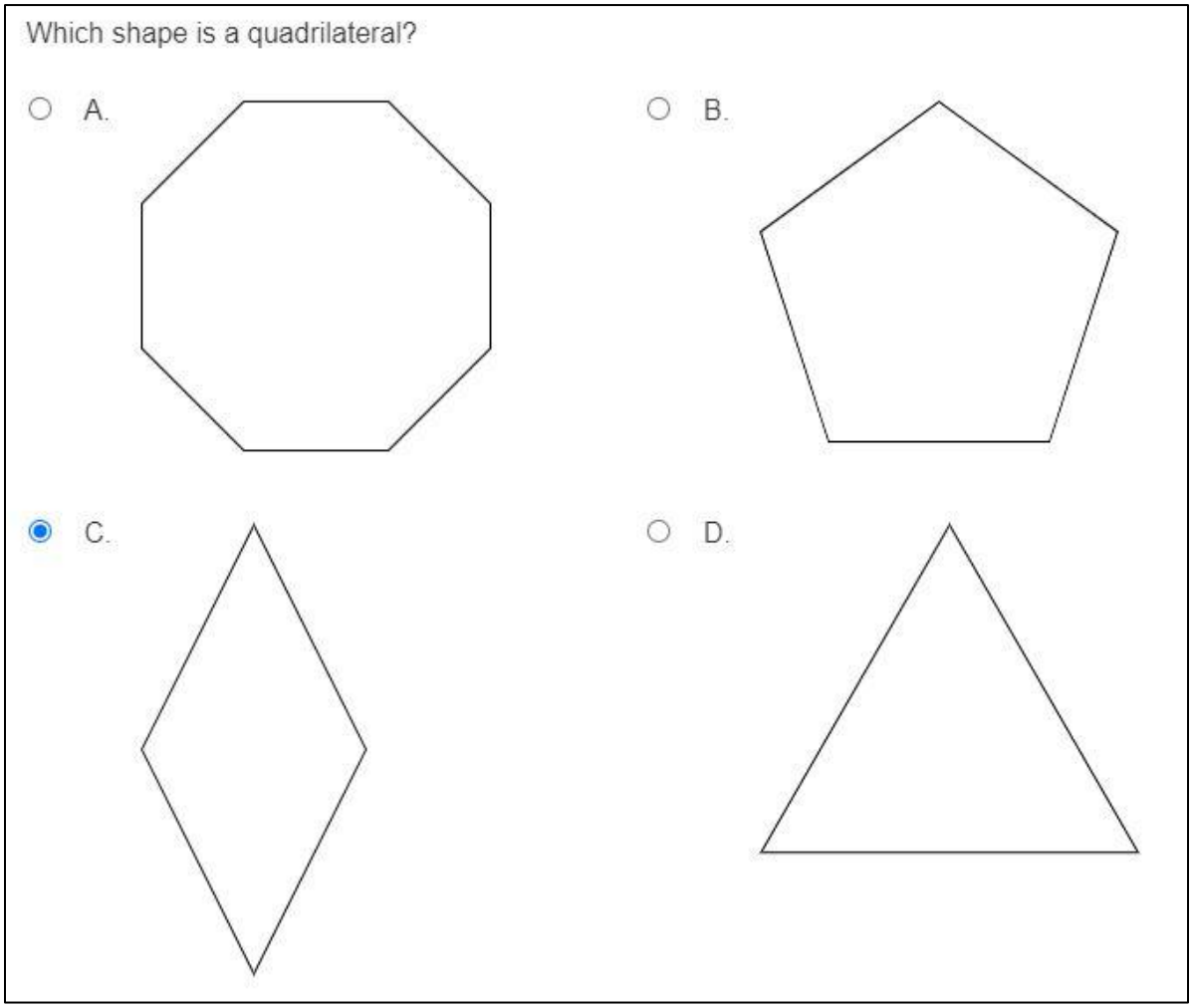
Points	Attributes
1	**Computation Component:** Student provides the correct values: Reading Space 1: 4 for the length Reading Space 2: 42 for the area Reading Space 3: 8 for the width **Note:** The three values must be correct to receive credit.
0	Student response is incorrect or irrelevant.

Scoring Rubric – Part B

Points	Attributes
2	Student response includes each of the following 2 elements. • **Reasoning Component**: Valid explanation whether each drawing shows an area of 40 square feet. • **Reasoning Component**: Valid explanation of a different way the reading space can have an area of 40 square feet.
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.
Sample Student Response:	Drawing 1 is incorrect when you find the area you multiply the two numbers so the area of drawing one is 100. Number 2 is correct 4 x 10 = 40 so it does have the area of 40. Another way it could have an area of 40 is 5 x 8 = 40 or 2 x 20 = 40 or maybe 1 x 40.

Annotation for Sample Student Response:	Score Point 2
	The response receives full credit. It includes each of the two required elements.
	Reasoning Component:
	• **Student Response:** Drawing 1 is incorrect, area of drawing one is 100. Number 2 is correct 4 x 10 = 40.
	  ○ **Rationale for Score:** The student provides a valid explanation of whether each drawing shows an area of 40 square feet by providing that drawing 1 is incorrect because the area is 100 (Drawing 1 is incorrect, area is 100) and that drawing 2 is correct because the area is 40 (Number 2 is correct 4 x 10 = 40).
	Reasoning Component:
	• **Student Response:** Another way it could have an area of 40 is 5 x 8 = 40 or 2 x 20 = 40, or 1 x 40.
	  ○ **Rationale for score:** The student provides a valid explanation of another way the reading space can have an area of 40 square feet (area of 40 is 5 x 8 = 40 or 2 x 20 = 40 or 1 x 40). Note that any one of the three expressions that equal 40 square feet would earn credit for this component.
	
	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.

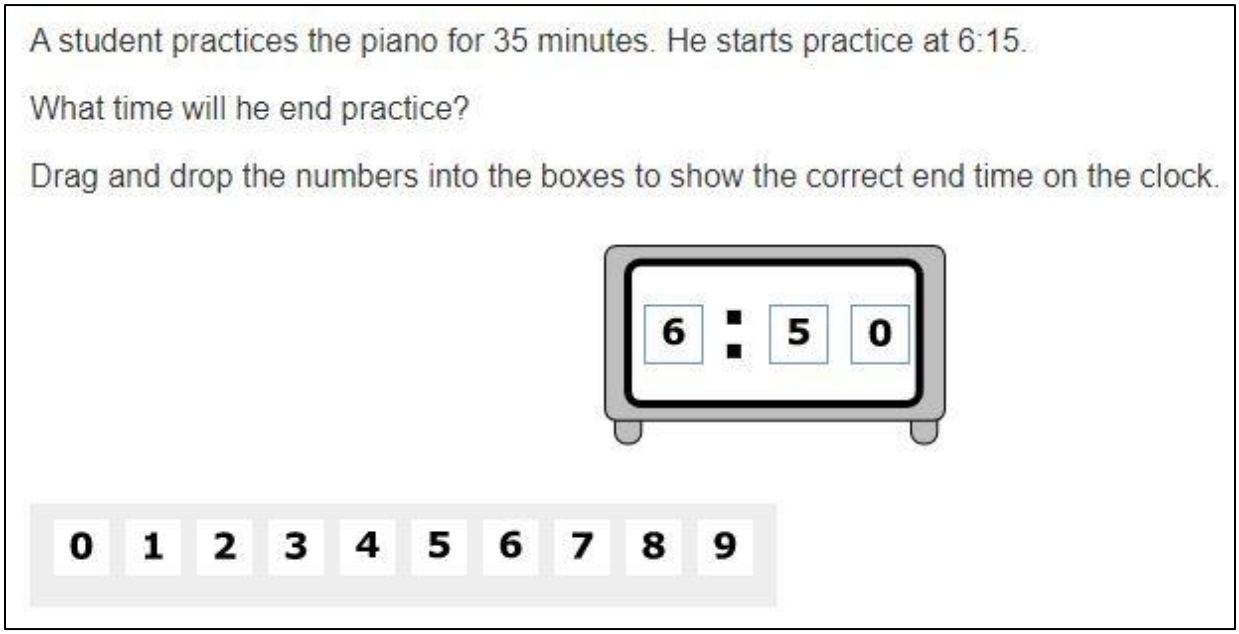
Item Set 3 - Question 3 (Selected Response)



Item Information

- Answer – C
- Colorado Academic Standards (CAS) Evidence Outcomes - 3.G.A.1
    - Explain that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.
- Evidence Statement – 3.G.1
    - Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories. i) A trapezoid is defined as "A quadrilateral with at least one pair of parallel sides."
- 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 – 0.673

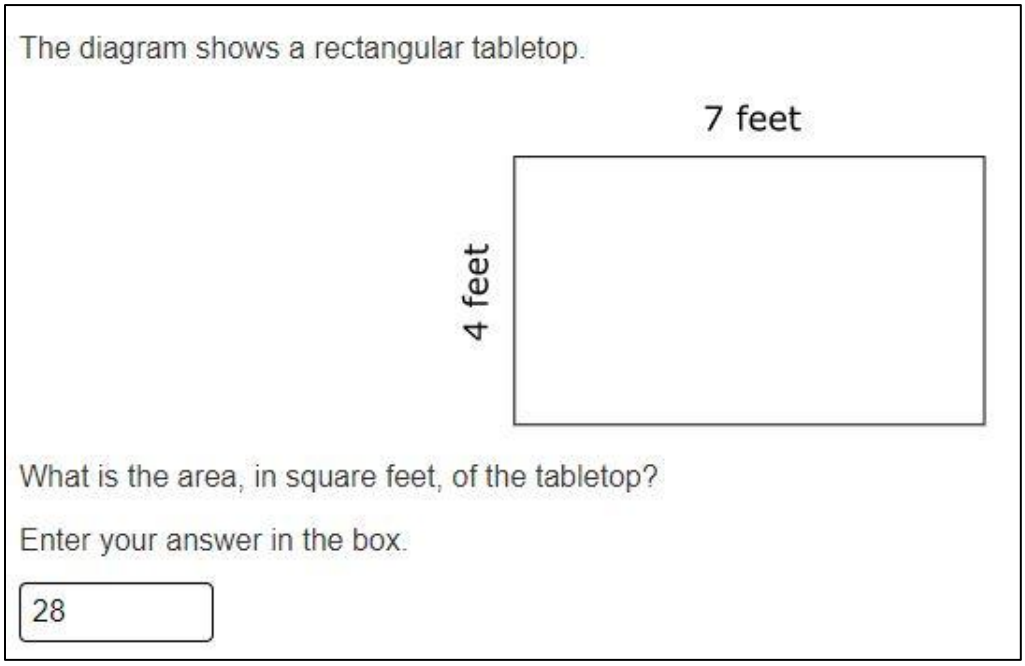
Item Set 3 - Question 4 (TEI Drag and Drop)



Item Information

- Answer – See Image
- Colorado Academic Standards (CAS) Evidence Outcomes – 3.MD.A.1
    - Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.
- Evidence Statement – 3.MD.1-1
    - Tell and write time to the nearest minute and measure time intervals in minutes. i) Time intervals are limited to 60 minutes. ii) No more than 20% of items require determining a time interval from clock readings having different hour values. Acceptable intervals: ex. Start time 1:20, end time 2:10 – time interval is 50 minutes. Unacceptable intervals: ex. Start time 1:20, end time 2:30 – time interval exceeds 60 minutes.
- 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 – 0.47

Item Set 3 - Question 5 (Fill in the Blank)



Item Information

- Answer – See Image
- Colorado Academic Standards (CAS) Evidence Outcomes – 3.MD.C.7.b
    - Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems and represent whole-number products as rectangular areas in mathematical reasoning.
- Evidence Statement – 3.MD.7b-1
    - Relate area to the operations of multiplication and addition. b. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real-world and mathematical problems. i) Products are limited to the 10 x 10 multiplication table. Notes: This ES is different from 3.OA.3-1 in the following ways: 3.MD.7b-1 emphasizes application/skill while the emphasis of 3.OA.3-1 is on demonstration of understanding of multiplication using not only area but also equal groups and arrays by modeling. 3.MD.7b-1 permits mathematical problems while 3.OA.3-1 is restricted to word problems. 3.MD.7b-1 allows for factors less than or equal to 5 while the factors used in 3.OA.3-1 are restricted to the harder three quadrants.
- 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 – 0.567

Item Set 3 - Question 6 (Selected Response)

What could the expression $27 \div 3$ stand for?

- A. There are 3 cows that leave a group of 27 cows.
- B. There are 3 cows that join a group of 27 cows.
- C. There are 27 groups with 3 cows each.
- D. There are 27 cows in 3 equal groups.

Item Information

- Answer – D
- Colorado Academic Standards (CAS) Evidence Outcomes – 3.OA.A.2
    - Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.
- Evidence Statement – 3.OA.2
    - Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8. i) Tasks involve interpreting rather than calculating quotients in terms of equal groups, arrays, area, and/or measurement quantities. (See 2020 CAS, Appendix: Table 2.) For example, “35 books are placed equally on 7 shelves” can be represented by the expression 35 ÷ 7 rather than “Marcie has 35 books. She placed the same number on each of 7 shelves. How many books did she place on each shelf?” ii) Tasks do not require students to interpret quotients in terms of repeated subtraction, skip-counting, or jumps on the number line. iii) The italicized example refers to describing a context. But describing a context is not the only way to meet the standard. For example, another way to meet the standard would be to identify contexts in which a number of objects can be expressed as a specified quotient. iv) 50% of tasks require interpreting quotients as a number of objects in each share. 50% of tasks require interpreting quotients as a number of equal shares.
- 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 – 0.478

Item Set 3 - Question 7 (Fill in the Blank)

A worker puts together baskets of fruit. He has a total of 63 pieces of fruit. He places 7 pieces of fruit in each basket.

Part A

There are 3 oranges in each basket. How many oranges are there in total?

Enter your answer in the box.

27

Part B

The worker sells 2 baskets of fruit. How many pieces of fruit does the worker have left in the remaining baskets?

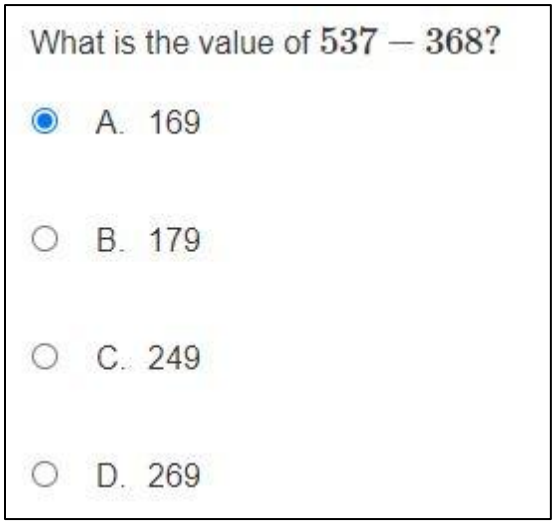
Enter your answer in the box.

49

Item Information

- Answer – See Image
- Colorado Academic Standards (CAS) Evidence Outcomes – 3.OA.D.8
    - Solve two-step word problems using the four operations. 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. (This evidence outcome is limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order of operations when there are no parentheses to specify a particular order.)
- Evidence Statement – 3.OA.8
    - Solve two-step word problems using the four operations. 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. i) 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. ii) 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. iii) 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.) iv) If scaffolded, one of the 2 parts must require 2-steps. The other part many consist of 1-step. v) Conversions should be part of the 2-steps and should not be a step on its own. vi) If the item is 2 points, the item should be a 2 point, unscaffolded item but the rubric should allow for 2-1-0 points.
- 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 – 0.237

Item Set 3 - Question 8 (Selected Response)

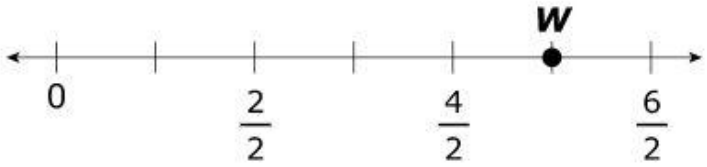


Item Information

- Answer – A
- Colorado Academic Standards (CAS) Evidence Outcomes – 3.NBT.A.2
    - Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
- Evidence Statement – 3.NBT.2
    - Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. i) Tasks have no context. ii) Tasks are not explicitly timed.
- 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 – 0.481

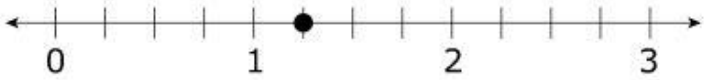
Item Set 3 - Question 9 (Selected Response)

Point W is shown at $\frac{5}{2}$ on the number line.



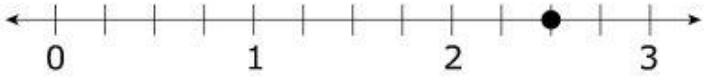
Which number line shows a fraction equivalent to $\frac{5}{2}$?

A.



B.

C.



D.

Item Information

- Answer – C
- Colorado Academic Standards (CAS) Evidence Outcomes – 3.NF.A.3.a
    - Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
- Evidence Statement – 3.NF.3a-2
    - Explain equivalence of fractions in special cases and compare fractions by reasoning about their size. a. Understand two fractions as equivalent (equal) if they are the same point on a number line. i) Tasks are limited to fractions with denominators 2, 3, 4, 6, and 8. ii) Fractions equivalent to whole numbers are limited to 0 through 5. iii) The explanation aspect of 3.NF.3 is not assessed here.
- 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 – 0.392