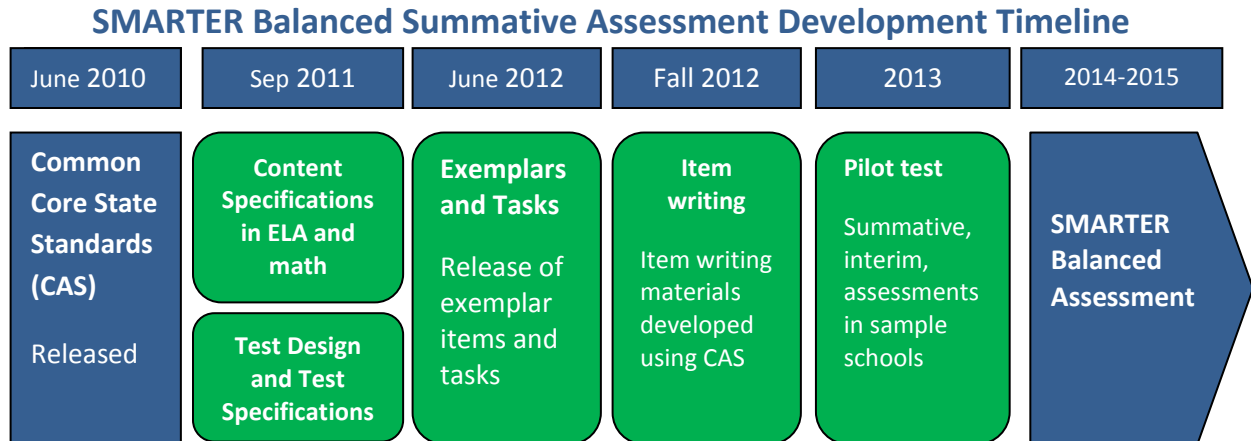# SMARTER Balanced Assessment
# 5<sup>th</sup> Grade Mathematics

As 2015 approaches and we transition from Missouri's traditional MAP testing to the Smarter Balanced Assessments, many teachers and administrators have been asking for information. What is the implementation timeline? What kinds of items will be on the test? What do assessment items look like? How are the tests scored? How will technology be utilized? While not every detail is known, information is available.

First, an implementation time line:

## SMARTER Balanced Summative Assessment Development Timeline

| June 2010 | Sep 2011 | June 2012 | Fall 2012 | 2013 | 2014-2015 |
|---|---|---|---|---|---|
| **Common Core State Standards (CAS)** <br><br> Released | **Content Specifications in ELA and math** <br><br> **Test Design and Test Specifications** | **Exemplars and Tasks** <br><br> Release of exemplar items and tasks | **Item writing** <br><br> Item writing materials developed using CAS | **Pilot test** <br><br> Summative, interim, assessments in sample schools | **SMARTER Balanced Assessment** |

From http://www.smarterbalanced.org/wordpress/wp-content/uploads/2012/05/TaskItemSpecifications/ItemSpecifications/GeneralItemSpecifications.pdf

## Item Types

SBAC assessments are made up of four item types: Selected-Response, Constructed-Response, Technology-Enhanced, and Performance Task. A description of those items follows.

**Selected-Response Items (SR)**
Traditionally known as multiple choice, selected-response items include a stimulus and stem followed by three to five options from which a student is directed to choose only one.

**Constructed-Response Items (CR)**
The main purpose of a constructed-response item is to address targets and claims that are of greater complexity. They ask students to develop answers without suggested answer choices.

**Technology-enhanced Items/Tasks (TE)**
Technology-enhanced items can provide evidence for mathematics practices that could not be as reliably obtained from traditional SRs and CRs. Technology-enhanced items may stand alone or may be a tool used as part of the Performance Task and/or Constructed-Response items.

**Performance Tasks (PT)**
Performance tasks, the most complex of all items, include the following elements:

- Integrate knowledge and skills across multiple claims.
- Measure capacities such as depth of understanding, research skills, and/or complex analysis with relevant evidence.
- Require student-initiated planning, management of information/data and ideas, and/or interaction with other materials.
- Reflect a real-world task and/or scenario-based problem.

- Allow for multiple approaches.
- Represent content that is relevant and meaningful to students.
- Allow for demonstration of important knowledge and skills.
- Require scoring that focuses on the essence of the Claim(s) for which the task was written.
- Seem feasible for the school/classroom environment.

## Claims

The Smarter Balanced summative assessments in mathematics are designed to measure the full range of student abilities in the Common Core State Standards or Core Academic Standards (CAS). Evidence will be gathered in support of four major claims: (1) Concepts and Procedures, (2) Problem Solving, (3) Communicating Reasoning, and (4) Modeling and Data Analysis. Students will receive an overall mathematics composite score. For the enhanced assessment, students will receive a score for each of three major claim areas. (Math claims 2 and 4 are combined for the purposes of score reporting.)

**Claim 1** — Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency.

**Claim 2** — Students can solve a range of complex, well-posed problems in pure and applied mathematics, making productive use of knowledge and problem-solving strategies.

**Claim 3** — Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.

**Claim 4** — Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems.

## Glossary

**Distracter**: the incorrect response options to an SR item.

**Distracter Analysis**: the item writer's analysis of the options or rationale for inclusion of specific options.

**Item**: the entire item, including the stimulus, question/prompt, answer/options, scoring criteria, and metadata.

**Key**: the correct response(s) to an item.

**Options**: the responses to a selected-response (SR) item from which the student selects one or more answers.

**Scoring Rubric**: the descriptions for each score point for an item/task that scores more than one point for a correct response.

**Stem**: the statement of the question or prompt to which the student responds.

**Stimulus**: the text, source (e.g., video clip), and/or graphic about which the item is written. The stimulus provides the context of the item/task to which the student must respond.

**Task**: similar to an item, yet typically more involved and usually associated with constructed-response, extended-response, and performance tasks.

**Top-Score Response**: one example of a complete and correct response to an item/task.

**Additional information** (including Scoring Rubrics) is available at:
http://www.smarterbalanced.org/wordpress/wp-content/uploads/2012/03/DRAFTMathItemSpecsShowcase2.pdf
http://www.smarterbalanced.org/wordpress/wp-content/uploads/2012/05/TaskItemSpecifications/ItemSpecifications/GeneralItemSpecifications.pdf

**Additional Sample Items are available:**

3RD GRADE SAMPLE ELA ITEMS

4TH GRADE SAMPLE ELA ITEMS

5TH GRADE SAMPLE ELA ITEMS

6TH GRADE SAMPLE ELA ITEMS

7TH GRADE SAMPLE ELA ITEMS

8TH GRADE SAMPLE ELA ITEMS

9TH GRADE SAMPLE ELA ITEMS

10TH GRADE SAMPLE ELA ITEMS

11TH GRADE SAMPLE ELA ITEMS

3RD GRADE SAMPLE MATHEMATICS ITEMS

4TH GRADE SAMPLE MATHEMATICS ITEMS

6TH GRADE SAMPLE MATHEMATICS ITEMS

7TH GRADE SAMPLE MATHEMATICS ITEMS

8TH GRADE SAMPLE MATHEMATICS ITEMS

HIGH SCHOOL SAMPLE MATHEMATICS ITEMS

# MAT.05.CR.1.0000G.K.556 C1 T1

| | |
|---|---|
| Sample Item ID: | MAT.05.CR.1.0000G.K.556 |
| Grade: | 05 |
| Claim(s): | **Claim 1: Concepts and Procedures** Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Assessment Target(s): | 1 K: Classify two-dimensional figures into categories based on their properties. |
| Content Domain: | Geometry |
| Standard(s): | 5.G.3, 5.G.4 |
| Mathematical Practice(s): | 1, 6 |
| DOK: | 2 |
| Item Type: | CR |
| Score Points: | 2 |
| Difficulty: | 2 |
| Key: | See Sample Top-Score Response. |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., Accessibility Issues): | |
| Notes: | This item requires both AI scoring and a TE template. |

Classify each shape according to its sides and angles. All shapes must be placed in at least one box.
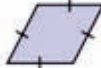
- If a shape isn't a square, rectangle, rhombus, or parallelogram, then place it in the box labeled "Other."
- If a shape meets the properties of more than one category, it must be placed into the boxes of all the types of shapes it can be classified as.

**Shapes**
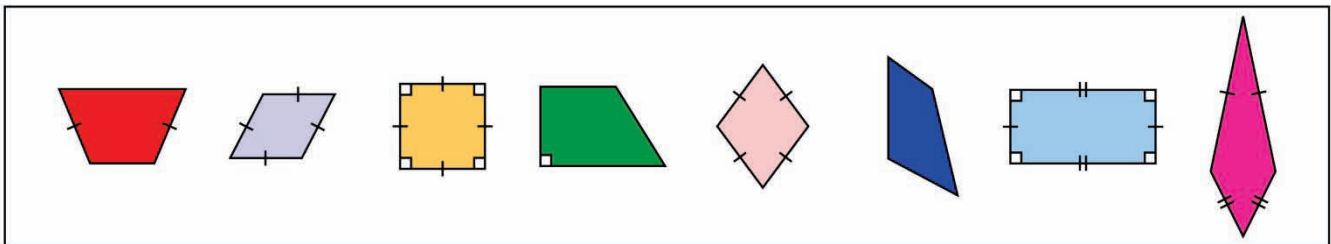
| Square | Rectangle | Rhombus | Parallelogram | Other |
|--------|-----------|---------|---------------|-------|
|        |           |         |               |       |

*Sample Top-Score Response:*

*Scoring Rubric:*

*Responses to this item will receive 0–2 points, based on the following:*

**2 points:** The student shows a thorough understanding of classifying two-dimensional shapes into categories based on their properties. The student correctly classifies each shape by placing it into all possible boxes. The student correctly classifies appropriate shapes by placing them into multiple boxes.

**1 point:** The student shows a partial understanding of classifying two-dimensional shapes into categories based on their properties. The student correctly classifies each shape by placing it into a single box. The student does not correctly classify the appropriate shapes by placing them into multiple boxes.

**0 points:** The student shows an inconsistent or no understanding of classifying two-dimensional shapes into categories based on their properties. The student incorrectly classifies 1 or more shapes.

## MAT.05.CR.1.000MD.G.256 C1 T1

| | |
|---|---|
| Sample Item ID: | MAT.05.CR.1.000MD.G.256 |
| Grade: | 05 |
| Primary Claim: | **Claim 1: Concepts and Procedures** Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Secondary Claim(s): | |
| Primary Content Domain: | Measurement and Data |
| Secondary Content Domain(s): | |
| Assessment Target(s): | 1 G: Convert like measurement units within a given measurement system. |
| Standard(s): | 5.MD.1, 5.NBT.5, 5.NBT.6 |
| Mathematical Practice(s): | 1, 2, 5, 6 |
| DOK: | 2 |
| Item Type: | CR |
| Score Points: | 3 |
| Difficulty: | M |
| Key: | See Sample Top-Score Response. |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., Accessibility Issues): | |
| Notes: | Requires both AI scoring and TE tools. |

Ms. Laurel sells orange juice at her restaurant. She uses conversions to calculate amounts of orange juice. Five measurements are shown below.

### *Part A*

Drag and drop each measurement to complete the equations below.

| 1 quart | 1 pint | 16 fluid ounces | 2 pints | 1 gallon |
|---|---|---|---|---|

$$\underline{\hspace{3cm}} = \underline{\hspace{3cm}}$$

$$\underline{\hspace{3cm}} = \underline{\hspace{3cm}}$$

**Done**

Click "Done" when you have completed the equations.

[If the entry is completed correctly, the student is prompted with the message "Good job! The equations are correct."]

Ms. Laurel had 10 cartons of orange juice in her restaurant on Monday. Each carton contains 128 fluid ounces of orange juice.

## Part B

| 1 pint | = | 16 fluid ounces |
|---|---|---|
| 1 quart | = | 2 pints |

Exactly how many **quarts** of orange juice did Ms. Laurel have in these 10 cartons on Monday?

☐ quarts

## Part C

| 1 pint | = | 16 fluid ounces |
|---|---|---|
| 1 quart | = | 2 pints |

In the restaurant, Ms. Laurel sells glasses of orange juice in two sizes. The table below shows the amount of orange juice each size glass will hold.

**Orange Juice**

| Size | Amount (fluid ounces) |
|---|---|
| Small | 8 |
| Large | 12 |

If she has 180 pints of orange juice, what is the greatest number of large glasses she could sell?

☐ large glasses

What is the greatest number of small glasses she could sell with 180 pints of orange juice?

☐ small glasses

---

*Sample Top-Score Response:*

**Part A**

| 1 pint | = | 16 fluid ounces |
|---|---|---|

| 1 quart | = | 2 pints |
|---|---|---|

**Part B**
40 quarts

**Part C**
240 large glasses

360 small glasses

*Scoring Rubric:*

*Responses to this item will receive 0–3 points, based on the following:*

**3 points:** The student shows thorough understanding of how to convert between fluid ounces, pints, and quarts. The student shows this understanding in his/her successful completion of all parts of this task. The student shows a thorough understanding by correctly creating conversions in *Part A*. The student correctly uses multiplication and/or division to determine conversion in *Part B*. For *Part C*, the student understands how to use multiple operations in order to solve for the greatest number of large or small glasses sold.

**2 points:** The student shows partial understanding of how to convert between fluid ounces, pints, and quarts. The student shows this understanding in his/her unsuccessful completion of *Part A*. The student correctly uses multiplication and/or division to determine conversion in *Part B*. For *Part C*, the student understands how to use multiple operations in order to solve for the greatest number of large or small glasses sold.

**1 point:** The student shows limited understanding of how to convert between fluid ounces, pints, and quarts, how to correctly use multiplication and division to find the conversions, and how to use multiple operations in order to solve for the number of glasses of each size that could be sold. The student answers only one part of the problem correctly.

**0 points:** The student shows inconsistent or no understanding of how to convert between fluid ounces, pints, and quarts, how to correctly use multiplication and division to find the conversions, and how to use multiple operations in order to solve for the number of glasses of each size that could be sold.

## MAT.05.CR.1.000MD.I.553 C1 T1

| | |
|---|---|
| Sample Item ID: | MAT.05.CR.1.000MD.I.553 |
| Grade: | 05 |
| Claim(s): | **Claim 1: Concepts and Procedures**<br>Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Assessment Target(s): | 1 I: Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition. |
| Content Domain: | Measurement and Data |
| Standard(s): | 5.MD.5 |
| Mathematical Practice(s): | 1, 2, 4, 6, 7 |
| DOK: | 2 |
| Item Type: | CR |
| Score Points: | 1 |
| Difficulty: | M |
| Key: | 792 |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., Accessibility Issues): | |
| Notes: | |

This diagram shows the dimensions, in centimeters, of two rectangular prisms joined together.
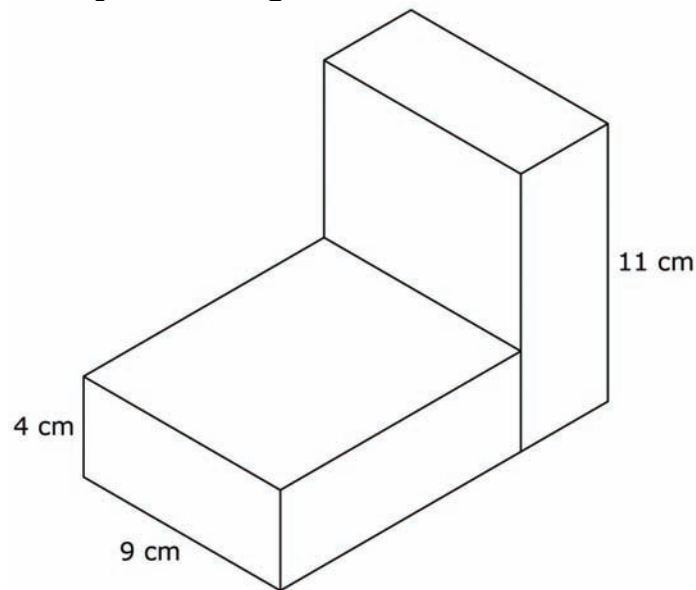


What is the combined volume of these prisms?

[    ]    cubic centimeters

# MAT.05.CR.1.000NF.E.557 C1 T1

| | |
|---|---|
| Sample Item ID: | MAT.05.CR.1.000NF.E.557 |
| Grade: | 05 |
| Claim(s): | **Claim 1: Concepts and Procedures**<br>Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Assessment Target(s): | 1 E: Use equivalent fractions as a strategy to add and subtract fractions. |
| Content Domain: | Number and operations – Fractions |
| Standard(s): | 5.NF.2 |
| Mathematical Practice(s): | 2, 6 |
| DOK: | 2 |
| Item Type: | CR |
| Score Points: | 1 |
| Difficulty: | L |
| Key: | $1\frac{1}{6}$ |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., Accessibility Issues): | |
| Notes: | |

The table below shows the length of ribbon, in yards, needed to make different art projects.

| Project | Length of Ribbon (in yards) |
|---|---|
| Flower | $1\frac{3}{4}$ |
| Bulletin board | $3\frac{1}{3}$ |
| Costume | 2 |
| Mask | $\frac{1}{3}$ |
| Puppet | $2\frac{1}{2}$ |
| Picture frame | $\frac{1}{4}$ |

Lance has $3\frac{2}{3}$ yards of ribbon. He is making a puppet. How much ribbon, in yards, will Lance have left?

☐ Yards

---

*Key:*

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

# MAT.05.CR.1.000NF.E.558 C1 T1

| | |
|---|---|
| Sample Item ID: | MAT.05.CR.1.000NF.E.558 |
| Grade: | 05 |
| Claim(s): | **Claim 1: Concepts and Procedures**<br>Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Assessment Target(s): | 1 E: Use equivalent fractions as a strategy to add and subtract fractions. |
| Content Domain: | Number and operations – Fractions |
| Standard(s): | 5.NF.2 |
| Mathematical Practice(s): | 2 |
| DOK: | 3 |
| Item Type: | CR |
| Score Points: | 1 |
| Difficulty: | M |
| Key: | costume, picture frame, and flower |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., Accessibility Issues): | |
| Notes: | Order of responses does not matter. |

The table below shows the length of ribbon, in yards, needed to make different art projects.

| Project | Length of Ribbon (in yards) |
|---|---|
| Flower | $1\frac{3}{4}$ |
| Bulletin board | $3\frac{1}{3}$ |
| Costume | 2 |
| Mask | $\frac{1}{3}$ |
| Puppet | $2\frac{1}{2}$ |
| Picture frame | $\frac{1}{4}$ |

Susan has 4 yards of ribbon and wants to make as many different art projects as possible. Which art projects can Susan make that will use exactly 4 yards of ribbon altogether?

*Key:*

Costume, picture frame, and flower
2 + ¼ + 1 ¾ = 4

## MAT.05.CR.2.0000G.A.157 Claim 2

| | |
|---|---|
| Sample Item ID: | MAT.05.CR.2.0000G.A.157 |
| Grade: | 07 |
| Primary Claim: | **Claim 2: Problem Solving**<br>Students can solve a range of well-posed problems in pure and applied mathematics, making productive use of knowledge and problem-solving strategies. |
| Secondary Claim(s): | Claim 1: Concepts and Procedures<br>Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Primary Content Domain: | Number and Operations in Base Ten |
| Secondary Content Domain(s): | |
| Assessment Target(s): | 2 A: Apply mathematics to solve well-posed problems arising in everyday life, society, and the workplace.<br><br>1 F: Apply and extend previous understandings of multiplication and division to multiply and divide fractions. |
| Standard(s): | 5.NF.4 |
| Mathematical Practice(s): | 1, 2, 5, 6, 7 |
| DOK: | 3 |
| Item Type: | CR |
| Score Points: | 2 |
| Difficulty: | M |
| Key: | See Sample Top-Score Response. |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., Accessibility Issues): | |
| Notes: | |

Three students created posters for a school election.

*Part A*

Carolyn created a square-shaped poster. The length of each side of this poster is $1\frac{1}{2}$ feet.

What is the area of this poster, in square feet?

Square feet

## Part B

William created a rectangular poster with the <u>same area</u> as Carolyn's poster. His poster has different dimensions than Carolyn's poster.

What could be the dimensions of William's poster, in feet?

Length= [          ] feet          Width= [          ] feet

---

*Sample Top-Score Response:*

**Part A:**

Area is $\frac{9}{4}$ square feet; decimal answers are acceptable for all parts.

**Part B:**

One possible answer: Length = $\frac{3}{4}$ feet     width = 3 feet

Any combination of length and width with a product that yields $\frac{9}{4}$ square feet.

**Scoring Note:**
Decimal answers are acceptable for all parts of this item.

---

*Scoring Rubric:*

Responses to this item will receive 0 - 2 points, based on the following:

**2 points:** The student has thorough understanding of solving real-world problems involving area of two-dimensional objects. This is shown by the student answering all parts correctly.

**1 point:** The student has partial understanding of solving real-world problems involving area of two-dimensional objects, but may not have attended to precision. The answer in Part A is correct, but the student makes an error in determining the dimensions of the rectangular poster in Part B. **OR** Part A is incorrect, but Part B dimensions give the same area as Part B.

**0 points:** The student shows inconsistent or no understanding on how to solve real-world problems involving area of two-dimensional objects.

## MAT.05.CR.2.000MD.A.581 Claim 2

| | |
|---|---|
| Sample Item ID: | MAT.05.CR.2.000MD.A.581 |
| Grade: | 05 |
| Primary Claim: | **Claim 2: Problem Solving**<br>Students can solve a range of well-posed problems in pure and applied mathematics, making productive use of knowledge and problem-solving strategies. |
| Secondary Claim(s): | Claim 1: Concepts and Procedures<br>Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency. |
| Primary Content Domain: | Measurement and Data |
| Secondary Content Domain(s): | 2 A: Apply mathematics to solve well-posed problems arising in everyday life, society, and the workplace.<br><br>1 G: Convert like measurement units within a given measurement system. |
| Assessment Target(s): | Measurement and Data |
| Standard(s): | 5.MD.1 |
| Mathematical Practice(s): | 1, 2, 5, 6 |
| DOK: | 2 |
| Item Type: | CR |
| Score Points: | 1 |
| Difficulty: | M |
| Key: | 1 foot 5 inches or 17 inches |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., Accessibility Issues): | |
| Notes: | |

Xian is practicing his long jumps for the track team.

- His first jump measured 3 yards, 1 foot, 2 inches.
- His second jump measured 2 yards, 2 feet, 9 inches.

How much farther is Xian's first jump than his second jump? Be sure to include the measurement units.

*Key and Distractor Analysis:*

1 foot 5 inches OR 17 inches.

## MAT.05.CR.2.000MD.C.555 Claim 2

| | |
|---|---|
| Sample Item ID: | MAT.05.CR.2.000MD.C.555 |
| Grade: | 05 |
| Primary Claim: | **Claim 2: Problem Solving**<br>Students can solve a range of well-posed problems in pure and applied mathematics, making productive use of knowledge and problem-solving strategies. |
| Secondary Claim(s): | Claim 1: Concepts and Procedures<br>Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Primary Content Domain: | Measurement and Data |
| Secondary Content Domain(s): | |
| Assessment Target(s): | 2 C: Interpret results in the context of a situation.<br><br>1 G: Convert like measurement units within a given measurement system. |
| Standard(s): | 5.MD.1 |
| Mathematical Practice(s): | 1, 2, 5 |
| DOK: | 2 |
| Item Type: | CR |
| Score Points: | 1 |
| Difficulty: | M |
| Key: | 120 |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., Accessibility Issues): | |
| Notes: | |

Shelbi needs wooden boards to build a platform. Each board is shaped like a rectangular prism and has a length of 2 meters, a height of 40 millimeters, and a width of 100 millimeters, as shown below.
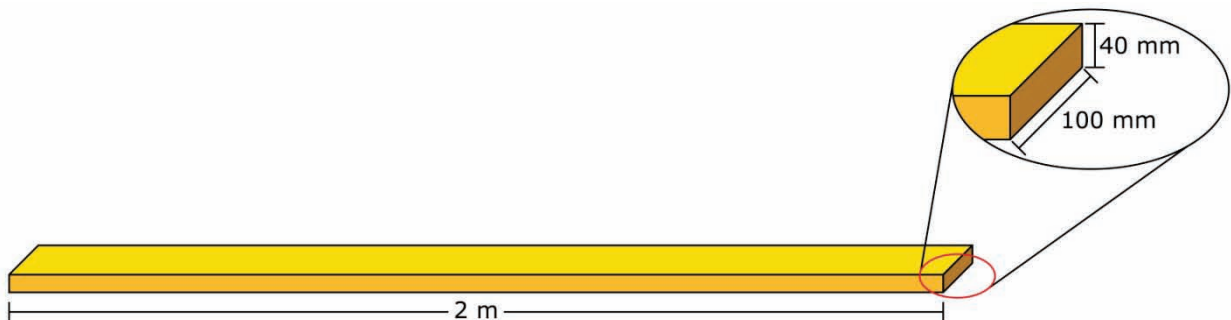
To build the platform, Shelbi will place the boards side by side, as shown in this diagram. The platform will have a total width of 12 meters.
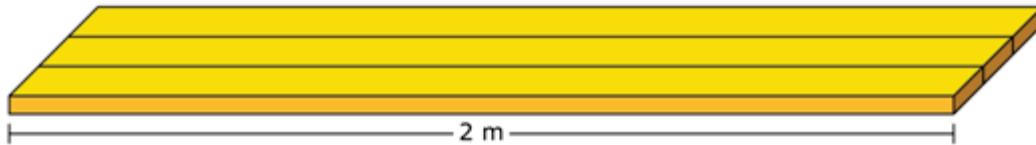


What is the **least** number of boards that Shelbi needs to build the platform?

Boards

## MAT.05.ER.1.000NF.F.255 C1 T1

| | |
|---|---|
| Sample Item ID: | MAT.05.ER.1.000NF.F.255 |
| Grade: | 05 |
| Claim(s): | **Claim 1: Concepts and Procedures**<br>Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Assessment Target(s): | 1 F: Apply and extend previous understandings of multiplication and division to multiply and divide fractions. |
| Content Domain: | Number and Operations-Fractions |
| Standard(s): | 5.NF.7, 5.OA.2, 5.NF.6 |
| Mathematical Practice(s): | 1, 2, 4 |
| DOK: | 2 |
| Item Type: | ER |
| Score Points: | 2 |
| Difficulty: | M |
| Key: | See Sample Top-Score Response. |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., accessibility issues): | |
| Notes: | |

Mr. Jones will cut 6 identical loaves of bread into pieces that are $\frac{1}{4}$ loaf each.

### *Part A*

After he cuts the 6 loaves, how many pieces will Mr. Jones have? Show your work using numbers, words, and/or pictures.

| |
|---|
| |

pieces

**Part B**

Mr. Jones will sell $\frac{2}{3}$ of the pieces that he cut in *Part A*. How many pieces of bread will Mr. Jones sell?

| | pieces
|---|

---

*Sample Top-Score Response:*

**Part A**



Mr. Jones will have 24 pieces of bread after he cuts the 6 loaves into 4 pieces each.

24 pieces

**Part B**

16 pieces

---

*Scoring Rubric:*

*Responses to this item will receive 0–2 points, based on the following:*

**2 points:** The student demonstrates thorough understanding of multiplying and dividing with fractions. The student shows calculations that support the correct answer of 24 pieces of bread.

**1 point:** The student demonstrates partial understanding of multiplying and dividing with fractions. The student correctly answers *Part A* but not *Part B*. **OR** The student incorrectly answers a portion of *Part A* and answers *Part B* based on the incorrect answer given for *Part A*, showing work that would have led to a correct solution if *Part A* had been correct.

**0 points:** The student demonstrates inconsistent or no understanding of multiplying and dividing with fractions. Student does not answer or gives an incorrect answer for both *Parts A* and *Part B*.

## MAT.05.CR.2.0000G.C.261 Claim 2

| | |
|---:|:---|
| Sample Item ID: | MAT.05.CR.2.0000G.C.261 |
| Grade: | 05 |
| Primary Claim: | **Claim 2: Problem Solving**<br>Students can solve a range of well-posed problems in pure and applied mathematics, making productive use of knowledge and problem-solving strategies. |
| Secondary Claim(s): | Claim 1: Concepts and Procedures<br>Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency. |
| Primary Content Domain: | Geometry |
| Secondary Content Domain(s): | |
| Assessment Target(s): | 2 C: Interpret results in the context of a situation.<br><br>1 J: Graph points on the coordinate plane to solve real-world and mathematical problems. |
| Standard(s): | 5.G.1, 5.G.2, 4.MD.3 |
| Mathematical Practice(s): | 1, 2, 4, 6 |
| DOK: | 3 |
| Item Type: | CR |
| Score Points: | 2 |
| Difficulty: | M |
| Key: | See Sample Top-Score Response. |
| Stimulus/Source: | 20 by 20 grid |
| Target-Specific Attributes (e.g., accessibility issues): | |
| Notes: | Requires AI scoring. |

Edna drew a square that had an area of 36 square units using the grid shown below. She started drawing her square at $(7, 10)$.
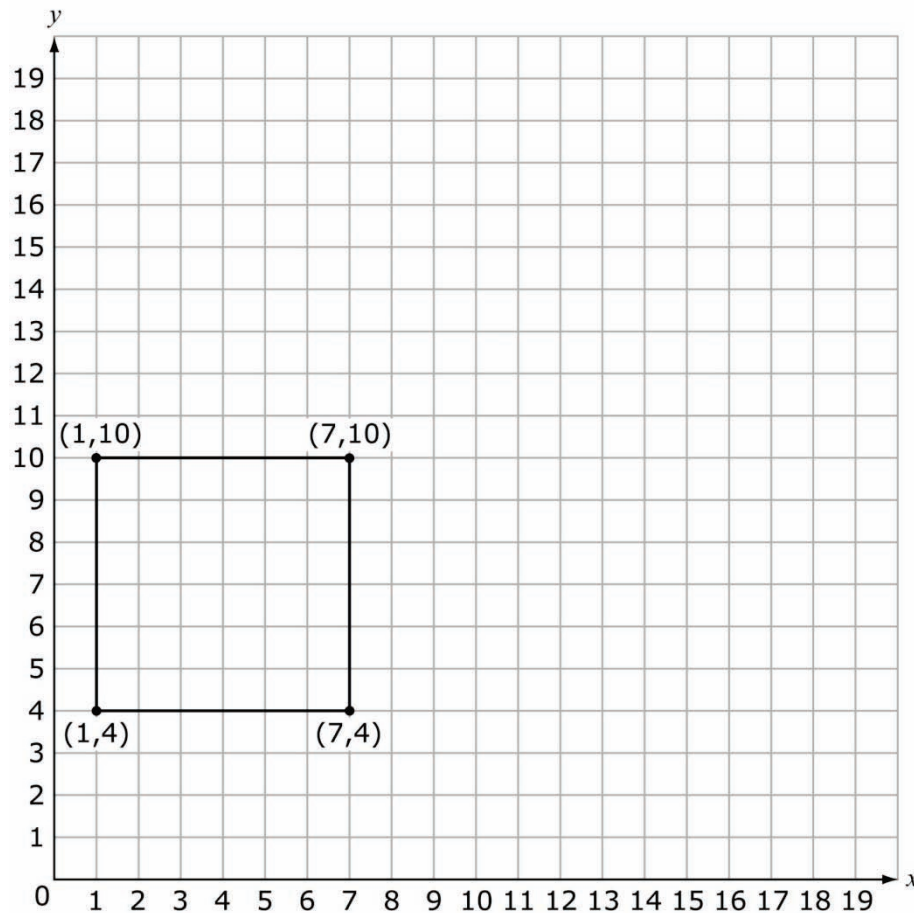
Draw the square that Edna could have made in the grid below. Be sure to label the coordinates of each vertex of the square.
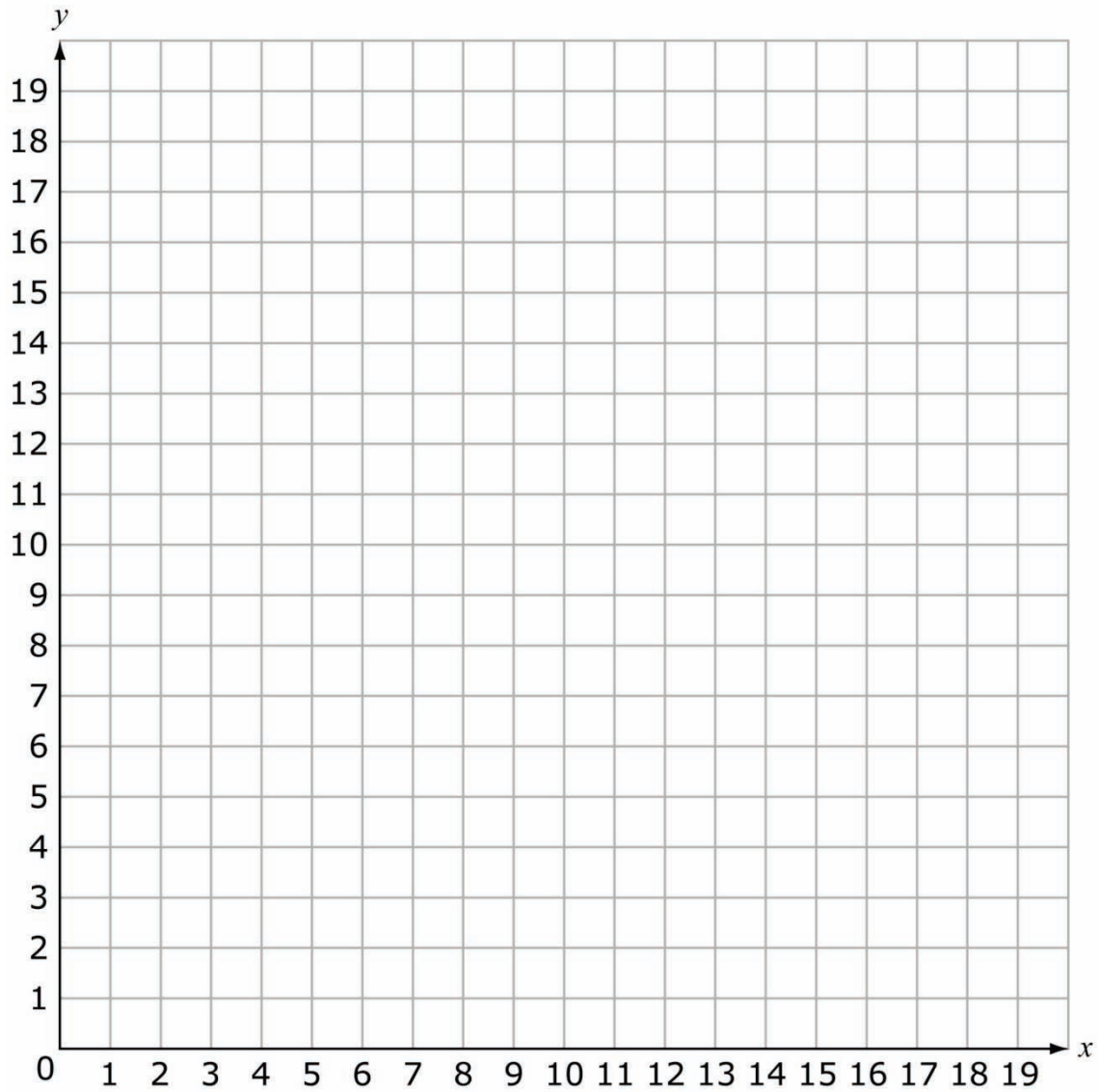
The vertices of Edna's square are:

(7, 10)  (   ,   )  (   ,   )  (   ,   )

*Sample Top-Score Response:*



*Scoring Rubric:*

**2 Points:** The student shows an ability to made productive use of problem solving strategies by plotting points located at $(1, 4)$, $(7, 4)$, $(1, 10)$ or $(13, 4)$, $(7, 4)$, $(13, 10)$ or $(13, 16)$, $(7, 16)$, $(13, 10)$ or $(1, 16)$, $(7, 16)$, $(1, 10)$.

**1 Point:** The student shows some ability to make productive use of problem-solving strategies by plotting points of a square that either has area of 36 square units, but does not use (7, 10) as a vertex. **OR** The student creates a square using (7, 10) as one vertex of the square, but does not attend to the requirement of having an area of 36 square units.

**0 Points:** The student shows little or no understanding of plotting points of a square with an area of 36 square units.

## MAT.05.ER.2.00NBT.A.245 Claim 2

| | |
|---|---|
| Sample Item ID: | MAT.05.ER.2.00NBT.A.245 |
| Grade: | 05 |
| Primary Claim: | **Claim 2: Problem Solving**<br>Students can solve a range of well-posed problems in pure and applied mathematics, making productive use of knowledge and problem-solving strategies. |
| Secondary Claim(s): | Claim 1: Concepts and Procedures<br>Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Primary Content Domain: | Number and Operations in Base Ten |
| Secondary Content Domain(s): | |
| Assessment Target(s): | 2 A: Apply mathematics to solve well-posed problems arising in everyday life, society, and the workplace.<br><br>1 D: Perform operations with multi-digit whole numbers and with decimals to hundredths. |
| Standard(s): | 5.NBT.5, 5.NBT.6 |
| Mathematical Practice(s): | 1,3 |
| DOK: | 3 |
| Item Type: | ER |
| Score Points: | 3 |
| Difficulty: | M |
| Key: | See Sample Top-Score Response. |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., Accessibility Issues): | |
| Notes: | Part of PT set |

Mrs. Phelps bought 4 boxes of crayons at the store to share with her students. Each box contained a total of 64 crayons.

### *Part A*

What is the total number of crayons Mrs. Phelps bought at the store? Explain your answer using diagrams, pictures, mathematical expressions and/or words.

crayons

## *Part B*

Mrs. Phelps wants to give each of her students an equal number of the crayons she bought. There are 32 students in Mrs. Phelps' class. How many crayons should each student get?

☐ crayons

## *Part C*

How many **more** boxes of crayons does Mrs. Phelps need if she wants each of her students to get 12 crayons? Explain your answer using diagrams, pictures, mathematical expressions and/or words.

☐ boxes of crayons

---

*Sample Top-Score Response:*

**Part A:** 256. I multiplied 4 by 64 and got 256 because there were 64 crayons in 4 boxes.

**Part B:** 8

**Part C:** 2. Since each student has 8 crayons from 4 boxes. Then she only needed 2 more boxes (half as many) in order to give each student 4 more crayons, for a total of 12 crayons each.

*Scoring Rubric:*

*Responses to this item will receive 0-3 points, based on the following:*

**3 points:** The student demonstrates thorough understanding of how to multiply and divide whole numbers. Answers all parts correctly and provides an adequate explanation or shows work in *Parts A* and *C.*

**2 points:** The student demonstrates good understanding of how to multiply and divide whole numbers. Answers two of three parts correctly and provides an adequate explanation or shows work for either *Part A* or *Part C.*

**1 point:** The student demonstrates partial understanding of how to multiply and divide whole numbers. Answers one of the three parts correctly, but does not provide an adequate explanation and does not show work for both *Parts A* and *C.*

**0 points:** The student demonstrates inconsistent or no understanding of how to multiply and divide whole numbers. Answers no parts correctly.

# MAT.05.ER.3.000OA.A.610 Claim 3

| | |
|---|---|
| Sample Item ID: | MAT.05.ER.3.000OA.A.610 |
| Grade: | 05 |
| Primary Claim: | **Claim 3: Communicating Reasoning**<br>Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others. |
| Secondary Claim(s): | Claim 2: Problem Solving<br>Students can solve a range of well-posed problems in pure and applied mathematics, making productive use of knowledge and problem-solving strategies.<br><br>Claim 1: Concepts and Procedures<br>Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Primary Content Domain: | Operations and Algebraic Thinking |
| Secondary Content Domain(s): | Numbers and Operations in Base Ten |
| Assessment Target(s): | 3 A: Test propositions or conjectures with specific examples.<br><br>2 A: Apply mathematics to solve well-posed problems arising in everyday life, society, and the workplace.<br><br>1 C: Understand the place value system. |
| Standard(s): | 5.OA.3, 4.NBT.4, 4.NBT.5 |
| Mathematical Practice(s): | 1, 2, 4, 7 |
| DOK: | 3 |
| Item Type: | ER |
| Score Points: | 2 |
| Difficulty: | M |
| Key: | See Sample Top-Score Response. |
| Stimulus/Source: | |
| Target-specific attributes (e.g., accessibility issues): | |
| Notes: | Part of PT set |

Branden's teacher said that beginning at age 2, children grow about 6 centimeters per year. Branden is 125 centimeters tall and is 9 years old.

In the table below, Branden used his current age and height to calculate his possible height for each of the previous 3 years.

### Branden's Age and Height

| Branden's Age (years) | Branden's Height (centimeters) |
|---|---|
| 9 | 125 |
| 8 | 119 |
| 7 | 113 |
| 6 | 107 |

Branden used the equation $7 \times 6 + \boxed{\phantom{x}} = 125$ to estimate how tall he was at age 2. Will the equation give him a reasonable estimate of his height at age 2? Explain your answer by relating the information in the table to the given equation.

What is a reasonable height for Branden at age 2?

$\boxed{\phantom{xxx}}$ centimeters

*Sample Top-Score Response:*

Yes, because Branden was 2 years old 7 years ago. 7 x 6 will be the number of centimeters he's grown. If you subtract that from 125, you should get how tall he was at age 2. Also, if you follow the pattern in the table (-6) and go all the way down to 2, you get the same answer; 83 centimeters.

*Scoring Rubric:*

*Responses to this item will receive 0-2 points, based on the following:*

**2 points:** The student demonstrates an ability to construct viable arguments in support of his or her reasoning by providing a complete explanation about the equation that represents the information in the table, and by providing 83 centimeters as a reasonable height.

**1 point:** The student demonstrates a partial ability to construct viable arguments in support of his or her reasoning by providing 83 as a reasonable height, but does not adequately relate the information in the table to the equation.

**0 points:** The student demonstrates inconsistent or no ability to construct viable arguments in support of his or her reasoning.

# MAT.05.PT.4.GEOCA.F.429 Claim 4

| | |
|---|---|
| Sample Item ID: | MAT.05.PT.4.GEOCA.F.429 |
| Title: | Geocaching |
| Grade: | 05 |
| Primary Claim: | **Claim 4: Modeling and Data Analysis**<br>Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems. |
| Secondary Claim(s): | Claim 3: Communicating Reasoning<br>Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.<br><br>Claim 1: Concepts and Procedures<br>Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Primary Content Domain | **Operations and Algebraic Thinking** |
| Secondary Content Domain(s): | Geometry |
| Assessment Target(s): | 4 F: Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas).<br><br>3 E: Distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in the argument—explain what it is.<br><br>3 F: Base arguments on concrete referents such as objects, drawings, diagrams, and actions.<br><br>1 J: Graph points on the coordinate plane to solve real-world and mathematical problems. |
| Standard(s): | 5G.2, 5OA.3, 4OA.3, 3G.6 |
| Mathematical Practice(s): | 1, 3, 8 |
| DOK: | 4 |
| Item Type: | PT |
| Score Points: | 12 |
| Difficulty: | M |
| How this task addresses the "sufficient evidence" for this claim: | The student is prompted to determine the location of points in the first quadrant of a coordinate plane in a real-life context.<br><br>The student is able to graph ordered pairs generated from patterns on a coordinate plane. |
| Target-specific attributes (e.g., accessibility issues): | Accommodations may be necessary for students who have fine-motor-skill challenges and language-processing challenges. |
| Stimulus/Source: | handouts, map, tables<br>http://www.youtube.com/watch?v=-4VFeYZTTYs<br>http://www.youtube.com/watch?v=gwYakJ9ENXQ |
| Notes: | "Geocaching" is an activity in which objects are hidden in secret locations for participants to find, using different tools. |

| Task Overview: | Students must create charts and maps to learn and complete a geocaching activity. |
|---|---|
| Teacher Preparation/ Resource Requirements: | Option 1: The teacher will set up a 15-by-15 "Treasure Grid" and cut out and place picture "treasures" (from pictures shown) at the locations shown on a "Treasure Coordinates" handout. This grid should be placed in a separate location (bulletin board, wall, etc.) and accessed by students in Session 2 only. The size of the units used can be determined by the amount of space available.<br><br>Option 2: The teacher provides the students with a "Treasure Grid" handout that contains a 15-by-15 grid with pictures graphed at coordinates shown on a "Treasure Coordinates" handout. The "Treasure Grid" handout is given to the students during Session 2 only.<br><br>Option 3: The 15-by-15 "Treasure Grid" with pictures graphed at the specified coordinates is built into the computer interface. The "Treasure Grid" would be available to the students during Session 2 only. |
| Teacher Responsibilities During Administration: | During the administration of the task, the teacher will monitor students and provide necessary accommodations. |
| Time Requirements: | Between 75 and 95 minutes for both sessions. |

[If option 2 or 3 in the Teacher Preparation section is chosen, prework will be altered accordingly.]

Prework:  In preparation for Session 2 of this task, a 15-by-15 "Treasure Grid" is created. Floor or ceiling tiles or other materials such as yarn or twine can be used to make the grid, which can be displayed on a wall in the classroom, the library, or in an activity room that students can access during Session 2. The teacher places pictures (shown at the end of this task) at the coordinates listed on the "Treasure Coordinates" table that follows. The students should not be able to see or interact with the grid until *Part C* of this task.

If possible, have students watch the video available at the link below prior to the start of the task. It provides a nice overview of what it means to "Geocache".

http://www.youtube.com/watch?v=-4VFeYZTTYs

# Treasure Coordinates

| | | | | |
|---|---|---|---|---|
| (1, 1) | Motorcycle | | (8, 5) | Tie |
| (1, 4) | Printer | | (8, 10) | Headphones |
| (1, 6) | Guitar | | (8, 11) | Video camera |
| (1, 8) | Cap/baseball | | (8, 12) | Music |
| (1, 15) | Boots | | (8, 13) | Magazines |
| (2, 4) | Sibling | | (8, 14) | Tractor |
| (2, 5) | Pickup truck | | (9, 3) | Vacation |
| (2, 12) | Hair dryer | | (9, 8) | Raincoat |
| (3, 1) | In-line skates | | (9, 13) | Surfboard |
| (3, 2) | Helicopter | | (10, 4) | Pens |
| (3, 3) | Shirt | | (10, 7) | Lawn mower |
| (3, 4) | Ring | | (10, 10) | Rain boots |
| (3, 5) | Sailboat | | (10, 14) | Musical instruments |
| (3, 9) | Sweatshirt | | (11, 1) | Boat |
| (3, 14) | Barbecue grill | | (11, 3) | Computer |
| (4, 1) | Skateboard | | (11, 9) | Ice skates |
| (4, 4) | Perfume | | (11, 12) | Jeans |
| (4, 5) | Mirror | | (12, 2) | Cat |
| (4, 7) | Socks | | (12, 4) | Laptop |
| (4, 14) | Jacket | | (12, 14) | Refrigerator |
| (5, 4) | Stove | | (13, 6) | Watch |
| (5, 7) | Belt | | (13, 7) | Van |
| (5, 12) | Football | | (13, 8) | Flowers |
| (6, 2) | Paper | | (13, 9) | Roses |
| (6, 5) | Food | | (13, 10) | Tree |
| (6, 9) | Car | | (14, 4) | Bicycle |
| (6, 14) | Leaves | | (14, 10) | CDs |
| (7, 2) | Microwave | | (14, 13) | Dog |
| (7, 4) | Gloves | | (15, 1) | Pants |
| (7, 7) | Game | | (15, 5) | House |
| (7, 8) | T-shirt | | (15, 9) | Purse |
| (7, 10) | Fish | | (15, 15) | Basketball |

# Geocaching

Geocaching is an indoor or outdoor treasure-seeking game. You can use different tools to find "treasure." A treasure seeker attempts to find the hidden treasure, or "geocache," by calculating the location using clues.

In this activity, a geocache is the hidden treasure that you must find using a set of clues. These clues will help you to determine the location of the geocache.

To complete this activity, you will:

- decipher the clues.
- create a map on a grid of where the geocache can be found.
- use the map to locate the geocache.
- locate new geocaches.
- create clues for a new geocaching task.

[The teacher distributes copies of the clues shown below.]

Geocaching Clues:

1. To find your way to treasure, you must know your "origin."
2. To find the "right" moves to make, you must always add 3.
3. To move "up" in the world of treasure hunting, you should start with the "1st" step and always move 1 step at a time.
4. If you "chart" out your course, finding treasure is easy.
5. When you can "picture" your hunt, finding treasure is like "following a map."
6. There are fewer than 10 geocaches to find with these clues.
7. The number of geocaches for which you strive is the number that rhymes with the word that follows "you."

## Session 1

## Deciphering the Clues

To begin geocaching, you will need to decipher clues to make your map. The map you will use for geocaching will be a coordinate grid. You will start at the origin and apply the clues to determine the location of the first treasure. You will then apply the same clues, starting at the previous location, to determine the location of the next treasure.

## *Part A*

On a coordinate grid, what are the coordinates for the origin?

(     ,     )

[The student receives immediate feedback after entering his or her coordinates of the origin.
If the student enters (0, 0), he or she is prompted with "Good job, that is correct!"
If the student enters anything other than (0, 0), he or she is prompted with "Sorry, but that is incorrect. The coordinates for the origin are (0, 0)."
If the student enters nothing and tries to move on, he or she is prompted with "Sorry, you must enter in the coordinates of the origin before moving on to the next step."]

Use the Geocaching Clues to answer the following questions.

How many geocache treasures are you to find using the clues? Explain how you got your answer.

What number of units should you move along the *x*-axis to find each geocache? Explain how you got your answer.

What number of units should you move along the *y*-axis to find each geocache? Explain how you got your answer.

Apply the Geocaching Clues to fill in the table below.

## Geocache Locations

| | *x* | *y* |
|---|---|---|
| Cache 1 | | |
| Cache 2 | | |
| Cache 3 | | |
| Cache 4 | | |
| Cache 5 | | |

**Create Your Map**

Now you are ready to create your map. To create your map, you will need to plot a star at each location of a geocache on your map.

*Part B*

You will use this map to find the geocaches on the Treasure Grid.

To graph a location, click on the gold star, then click on a location on the grid.

To remove a star from the grid, locate the star and click on it.

## Session 2

[The teacher directs the students to either copy this information on the map created in *Part B* or print their map, as resources permit.]

### *Part C*

Travis created the following map.

**Travis's Map**
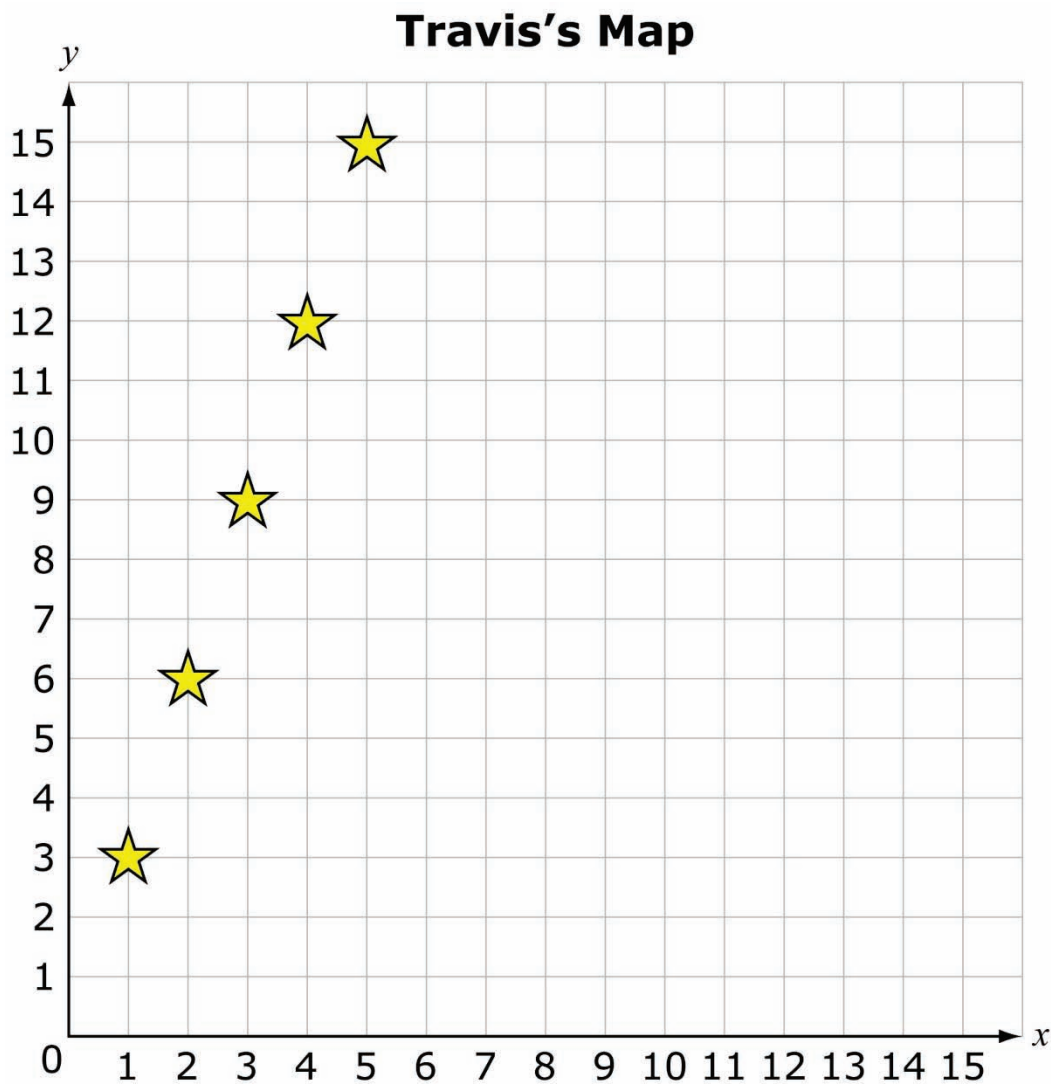


Did Travis apply the clues correctly to determine the locations of the geocaches? Explain why or why not.

## Part D

# Locating the Geocache

[If Option 2 or 3 in the Teacher Preparation section is chosen, the teacher prompt will be altered accordingly.]

*Teacher says:*
Now you can use the map you created to find the treasures located on the Treasure Grid. Remember, you are not allowed to touch or change the location of any of the treasures on the Treasure Grid. Your goal is to identify the treasure found at the locations you have determined on your map. You will need to record the object that is at each location. You may not discuss your search with any other student.

## Map Worksheet

Student Name: _____
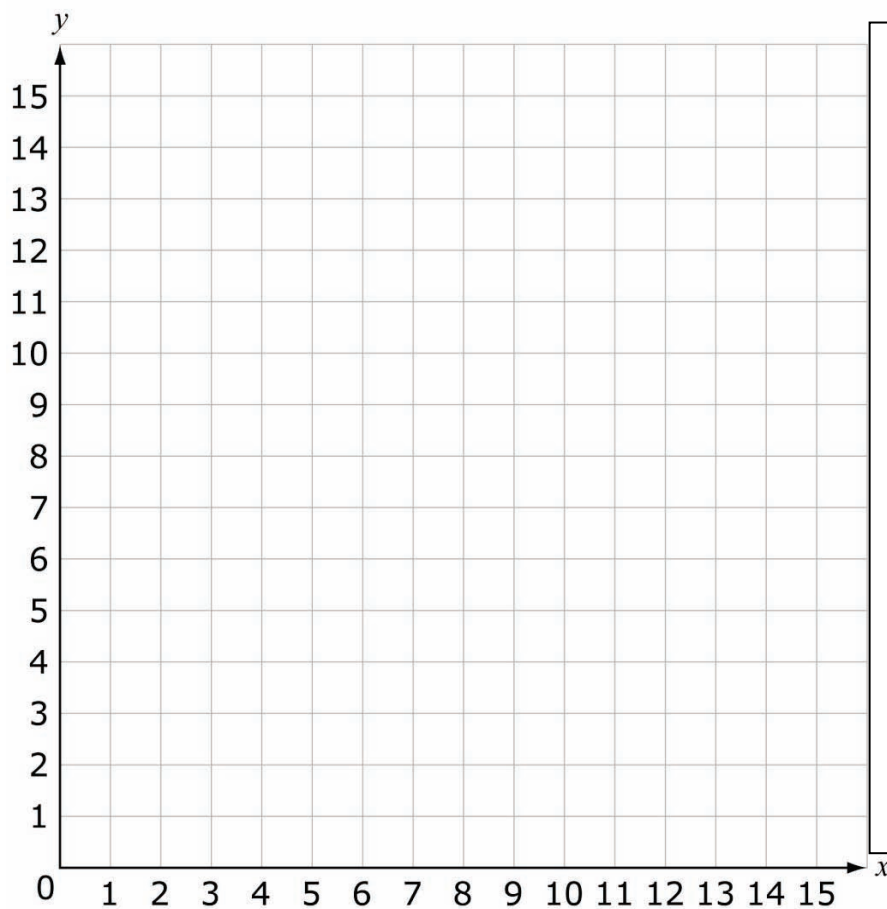


List of Geocaches

*Teacher says:*
Write down the name of the item found at each location on your map. If there is not an item at a location you mapped, write that the geocache was empty. You will now need to return to your computer station to enter your findings.

[The teacher facilitates, allowing students to go to the Treasure Grid one or two at a time. The teacher ensures that the geocaches are not moved. The student returns to his or her desk to electronically enter the data into the table using the information collected on the printout of his or her map or notes, depending on the availability of resources.]

## Part E
*Teacher says:*
Your next task is to plan for the next group of geocaching treasure-seekers. Write the coordinates for each of the items shown below.

[The teacher writes these items in the order below on the board or makes this list accessible to each student. The teacher then facilitates as the students go to the Treasure Grid to locate the new treasures shown below.]

### Sellina's List

|   | Treasure | Coordinates |
|---|----------|-------------|
| 1 | Printer  |             |
| 2 | Sibling  |             |
| 3 | Ring     |             |
| 4 | Perfume  |             |
| 5 | Hair dryer |           |

Use words and numbers to create clues that the next group of geocachers could use to accurately find the items listed in the table above.

To create clues:
- First, determine the coordinates of a starting point.
- Then, use a numerical expression that describes how to get to the next coordinate, given the starting coordinate.
- Next, be able to repeat a numerical expression to determine the location of each item in the table.

*Sample Top-Score Response:*

*Part A*

(0, 0)

5, because the word that comes after the word "you" in the clue is "strive," and "five" is the only number less than 10 that rhymes with "strive."

3 units, because clue number 3 says to move 3 units to the right.

1, because clue number 4 says to move up 1 step.

## Geocache Locations

|         | x  | y |
|---------|----|---|
| Cache 1 | 3  | 1 |
| Cache 2 | 6  | 2 |
| Cache 3 | 9  | 3 |
| Cache 4 | 12 | 4 |
| Cache 5 | 15 | 5 |

*Part B*
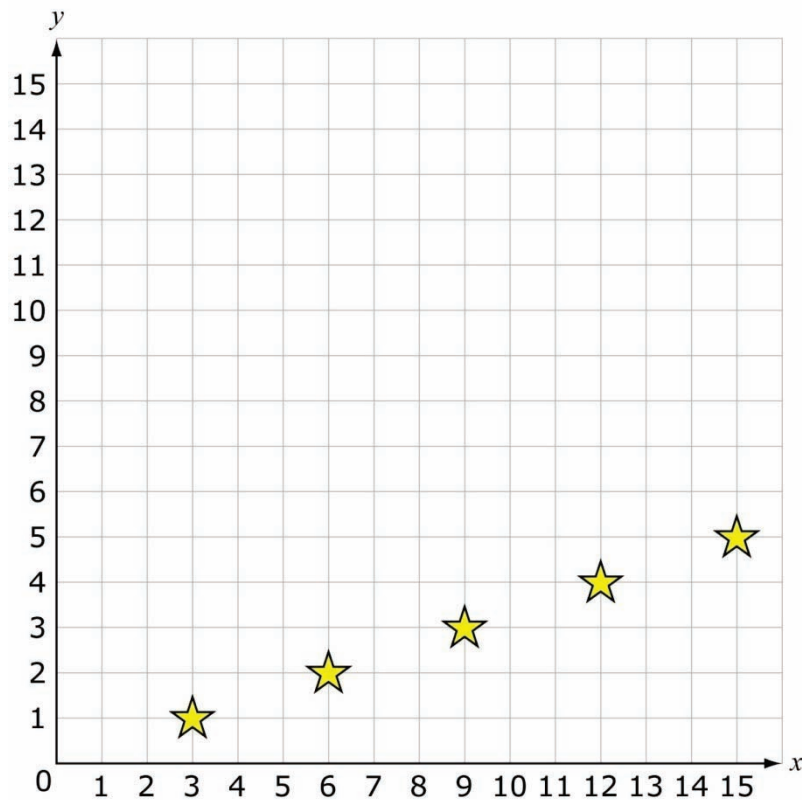


*Part C*
No, because he switched the *x*- and *y*-coordinates when he plotted the stars onto the graph.

*Part D*
Rollerblades, Paper, Vacation, Laptop, House

*Part E*

**Sellina's List**

|   | Treasure | Coordinates |
|---|----------|-------------|
| 1 | Printer | (1, 4) |
| 2 | Sibling | (2, 4) |
| 3 | Ring | (3, 4) |
| 4 | Perfume | (4, 4) |
| 5 | Hair dryer | (5, 4) |

1. Start at the origin.
2. Then, add 4 to the value of the *y*-coordinate, add 1 to value of the *x*-coordinate, and find a geocache.
3. Then, apply *x* + 1.
4. Then, repeat the previous expression 3 times.

*Scoring Rubric:*

Responses to this item will receive 0–12 points, based on the following:

*Part A*

**4 points:** The student enters (0, 0). The student provides 5, 3, and 1. The student explains each answer clearly and precisely by constructing viable arguments to support his or her answer. The student provides values to correctly complete the table.

**3 points:** The student does not enter (0, 0). The student provides 5, 3, and 1. The student explains each answer clearly and precisely by constructing viable arguments to support his or her answer. The student provides values to correctly complete the table.

**2 points:** The student does not enter (0, 0). The student provides 5, 3, and 1. The student shows little or no explanation for each answer. The student provides values to correctly complete the table. **OR** The student enters (0, 0). The student provides up to two answers correctly (from 5, 3, and 1). The student explains each answer clearly and precisely by constructing viable arguments to support his or her answer. The student partially completes the table.

**1 point:** The student enters (0, 0). The student does not provide 5, 3, and 1. The student does not explain each answer clearly and precisely by constructing viable arguments to support his or her answer. The student does not provide values to correctly complete the table.

**0 points:** The student enters something other than (0, 0). The student does not provide 5, 3, and 1. The student does not explain each answer clearly and precisely by constructing viable arguments to support his or her answer. The student does not provide values to correctly complete the table.

*Part B*

**2 points:** The student analyzes the real-world situation to graph exactly 5 points correctly in the coordinate plane.

**1 point:** The student analyzes the real-world situation to correctly graph 3 or more points in the coordinate plane with up to 1 additional incorrect point.

**0 points:** The student analyzes the real-world situation to graph 2 or fewer points accurately in the coordinate plane.

*Part C*
**2 points:** The student answers "No" and clearly and precisely constructs viable arguments to critique the reasoning of others by clearly explaining why the graph was plotted incorrectly.

**1 point:** The student answers "No" and constructs little or no argument to critique reasoning by explaining why the graph was plotted incorrectly.

**0 points:** The student answers "No" and has no explanation; the student answers yes; or the student does not answer.

*Part D*

**1 point:** The student lists all of the correct treasures (In-line Skates, Paper, Vacation, Laptop, House) in correct order.

**0 points:** The student lists all of the correct treasures (In-line Skates, Paper, Vacation, Laptop, House) and not in the correct order.
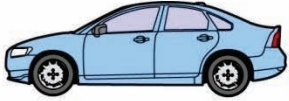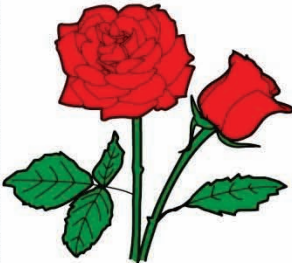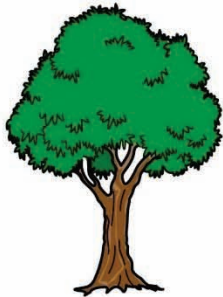
*Part E*
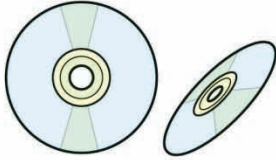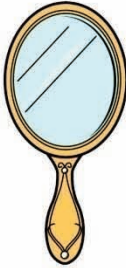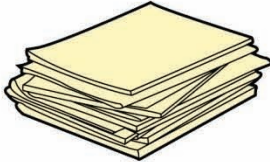
**3 points:** The student shows the ability to identify important quantities in a practical situation by identifying a starting point. The student describes movement from one point to the next using an expression that could be repeated to obtain the location of the remaining geocache locations.
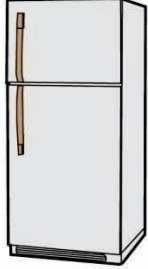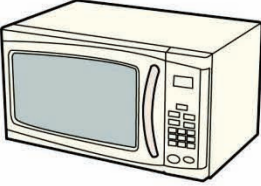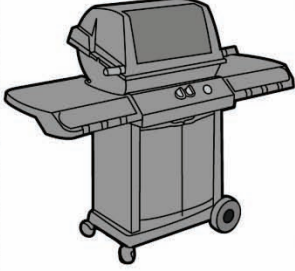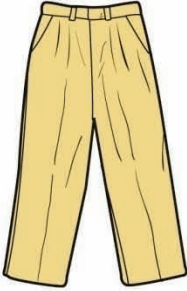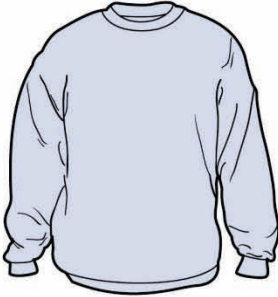
**2 points:** The student shows some ability to identify important quantities in a practical situation by identifying a starting point. The student describes a movement from one point to the next using an expression that is repeated to obtain the location of the remaining incorrect geocache.
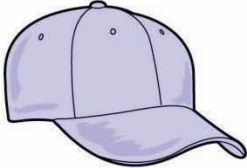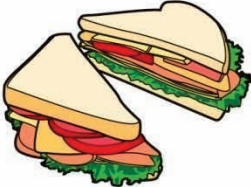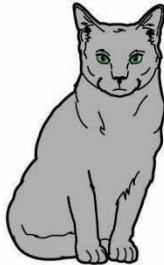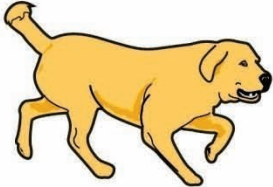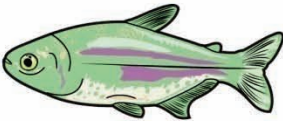
**1 point:** The student does not show an ability to identify important quantities in a practical situation by identifying an incorrect starting point. The student describes a movement from one point to the next using an expression. The expression cannot be repeated to obtain the location of the remaining geocache.

**0 points:** The student does not show an ability to identify important quantities in a practical situation by identifying an incorrect starting point. The student does not describe a movement from one point to the next using an expression.

| skateboard | motorcycle | pickup truck | tractor |
|---|---|---|---|
| van | bicycle | boat | car |
| helicopter | sailboat | in-line skates | ice skates |
| basketball | football | surfboard | game |

| laptop | CDs | computer | paper |
|--------|-----|----------|-------|
| printer | pens | mirror | perfume |
| hair dryer | headphones | magazines | music |
| video camera | flowers | roses | tree |

| | | | |
|---|---|---|---|
| lawn mower | leaves | stove | refrigerator |
| microwave | barbecue grill | watch | shirt |
| jacket | T-shirt | jeans | pants |
| sweatshirt | tie | rain boots | ring |

| purse | socks | belt | boots |
| cap/baseball | gloves | raincoat | guitar |
| musical instruments | food | cat | dog |
| fish | house | vacation | sibling |

## MAT.05.PT.4.SCHFE.A.272 Claim 4

| Item ID: | MAT.05.PT.4.SCHFE.A.272 |
|---|---|
| Title: | School Festival |
| Grade: | 05 |
| Primary Claim: | **Claim 4: Modeling and Data Analysis**<br>Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems. |
| Secondary Claim(s): | Claim 1: Concepts and Procedures<br>Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Primary Content Domain | **Number and Operations in Base Ten** |
| Secondary Content Domain(s): | Number and Operations—Fractions |
| Assessment Target(s): | 4 A: Apply mathematics to solve problems arising in everyday life, society, and the workplace.<br><br>4 D: Interpret results in the context of a situation.<br><br>1 D: Perform operations with multi-digit whole numbers and with decimals to hundredths.<br><br>1 E: Use equivalent fractions as a strategy to add and subtract fractions. |
| Standard(s): | 5.NBT.5, 5.NBT.6, 5.NF.2, 5.NF.6, 4.NF.3, 4.NF.4, 3.MD.3, 3.MD.1 |
| Mathematical Practice(s): | 1, 2, 3, 4, 6, 8 |
| DOK: | 4 |
| Item Type: | PT |
| Score Points: | 18 |
| Difficulty: | H |
| How this task addresses the "sufficient evidence" for this claim: | The student uses concepts of number and operations in base ten and fractions to accomplish tasks required of a committee member as part of planning an end of the year festival. The work is supported by calculations and explanations of reasoning. |
| Target-specific attributes (e.g., accessibility issues): | Accommodations may be necessary for students who have fine-motor-skill challenges and language-processing challenges. |
| Stimulus/Source: | http://www.verybestbaking.com/recipes/18476/Original-NESTL%C3%89-TOLL-HOUSE-Chocolate-Chip-Cookies/detail.aspx |
| Notes: | Multi-part task |
| Task Overview: | Students are asked to plan various aspects of a school festival within budget constraints. |
| Teacher preparation / Resource requirements: | Teacher preparation: This task can be done in 1 or 2 sessions depending on instructional time constraints.<br><br>Resources: Materials/time to complete various independent |

| | tasks. The answer documents that are a part of the assessment are included at the end of this sample. |
|---|---|
| Teacher Responsibilities During Administration: | Monitor individual student work; provide resources as necessary. |
| Time Requirements: | Scored sections of this task should take no more than 90 minutes. |

Prework:   (May be blank)

# School Festival

You serve on a committee that is in charge of planning a school festival. The following tasks need to be completed by committee members as part of the planning for the school festival.

- Determine the budget for the festival.
- Choose the food and drinks for the festival.
- Determine amounts of supplies for making a dessert.
- Make a schedule of the different activities.
- Make some decisions on the games and prizes used during the festival.

## *Part A*

Your first task is to determine how much money to spend on food and drinks, prizes, and activities.

This graph shows how last year's budget of $800 was spent.

**Last Year's Festival Budget**
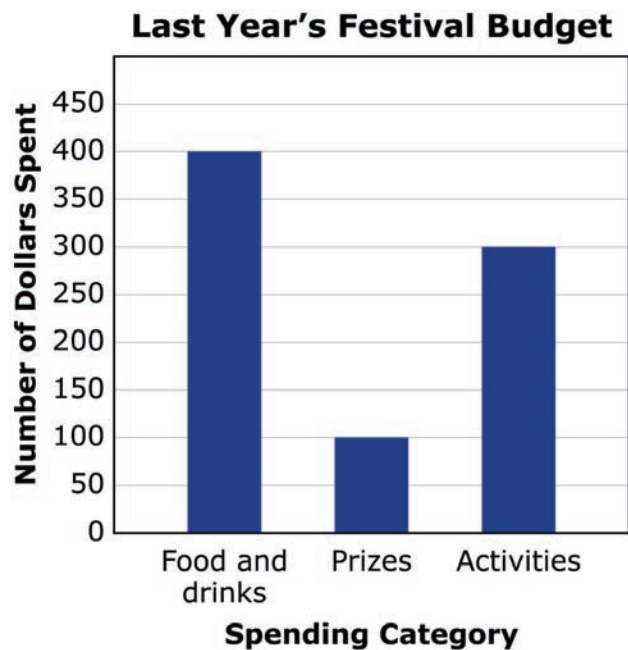


This year's budget has been increased to $1600. The fraction of the money used for each spending category should be the same as the fraction of the money used for each category last year.

Write a summary of the changes to the budget. The summary must include—

- a bar graph showing the dollar amounts that will be spent in each category (be sure to include a title and labels)
- a description of the steps used to find each dollar amount shown in the bar graph

*Part B*

## Food and Drinks

Your next task is to make decisions about the food and drinks that will be available at the festival. You need to determine the amount of food, drinks, plates, cups, and utensils that will be available for the people who attend the festival. You must also decide which types of food and drinks you will provide.

There are 75 students who will attend the festival. Each student will bring 1 guest to the festival. A total of 50 teacher and community members will also attend the festival.

The table that follows shows the amounts charged for different foods and drinks by two different restaurants.

|  | **Restaurant A** | **Restaurant B** |
|---|---|---|
| **Taco Meals** | $4 per person | $4 per person |
| **Hamburger Meals** | $5 per person | $3 per person |
| **Lemonade** | Free | $75 for every 100 people |
| **Water** | Free | $50 for every 100 people |
| **Plates, Cups, and Utensils** | Free | Free |

Guidelines:
- You must choose 1 restaurant to provide the food and drinks for the festival. You must also choose 1 meal type.
- You may choose 1 or 2 drinks.
- You must make sure you have enough money in your budget for the choices you make.

The principal of the school needs to approve all committee decisions. Write a note to the principal that identifies the restaurant you have chosen and clearly explains why the restaurant is the better value. Your note should include—

- the total number of people attending the festival
- the calculated price for using that restaurant and how that price was calculated
- how you determined that the restaurant you chose was the better value

*Part C*

## Make the Dessert

Parents have volunteered to provide cookies for the festival. One parent will buy the ingredients and then bake the cookies. The parent wants to be sure she has enough of each ingredient available to make cookies for all participants. The parent asks you to determine the amount needed for each item in the recipe shown below.

**Chocolate Chip Cookies**
**(serves 40 people)**

$2\frac{1}{4}$ cups flour

1 teaspoon baking soda

1 teaspoon salt

1 cup butter

$\frac{3}{4}$ cup white sugar

$\frac{3}{4}$ cup brown sugar

2 eggs

2 cups chocolate chips

Fill in the list below with the amount needed for each item. Remember to think about the total number of people who will attend the festival.

**Item Amounts**

_____ cups flour

_____ teaspoons baking soda

_____ teaspoons salt

_____ cups butter

_____ cups white sugar

_____ cups brown sugar

_____ eggs

_____ cups chocolate chips

Use the space below to show or explain in words how you calculated the amount of flour needed.

Use the space below to show or explain in words how you calculated the amount of brown sugar needed.

## Part D

### Schedule of Activities

The school festival will start at 11:00 A.M. on Saturday. The list below shows the amounts of time each activity should last.

- Presentation by principal: 30 minutes
- Lunch: $1\frac{1}{2}$ hours
- Student and teacher basketball game: 1 hour
- Band performance: 30 minutes
- Games for prizes: 2 hours
- Break: 15 minutes

Finish filling out the schedule below so there are no gaps in time. Also, none of the activities can happen at the same time.

| Activity | Start Time | End Time |
|---|---|---|
| Presentation by principal | 11:00 A.M. | |
| Lunch | | |
| Student and teacher basketball game | | |
| Break | | |
| Band performance | | |
| Break | | |
| Games for prizes | | |

**Games and Prizes**

*Part E*

Each time a student wins a game, he or she will get a prize. You will use the money in your budget to buy 4 boxes of prizes. You will spend the same amount of money on each box of prizes.

Attach a price tag to each box below to show the amount of money you will spend to buy the prizes in it.
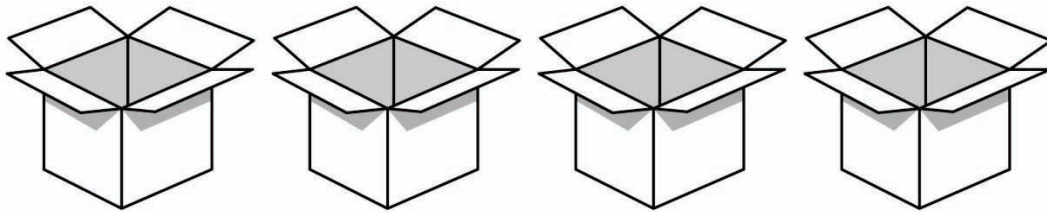


Show the steps used or explain how you found the price for each box of prizes in the space below.

Each box contains 90 prizes. The prizes will be split evenly among the 3 games. The names of the three games students will be able to play for prizes are shown below.

1. Fishing for Sharks
2. Pie the Teacher
3. Frog Jumping

Draw a model below to show both the number of boxes and the number of prizes that will be used for each game. Be sure to label what each part represents.

*Sample Top-Score Response:*

**Part A**

**School Festival Budget Summary**

The equation representing the spending for both years is:

Food and Drinks + Prizes + Activities = Total

The number sentences below show how the spending categories make up the fractions of last year's budget.

$$\frac{400}{800} + \frac{100}{800} + \frac{300}{800} = \frac{800}{800} = 1 \text{ total amount}$$

$$\frac{4}{8} + \frac{1}{8} + \frac{3}{8} = 1 \text{ total amount}$$

I calculated the amounts in the spending categories for this year by taking the same number sentence from last year and multiplying each fraction by the new budget total. The number sentences below show this.

$$\frac{4}{8}(1600) + \frac{1}{8}(1600) + \frac{3}{8}(1600) = 1600$$

$$800 + 200 + 600 = 1600$$

I used these values to make the bar graph below.

*Sample Top-Score Response:*

**This Year's Festival Budget**
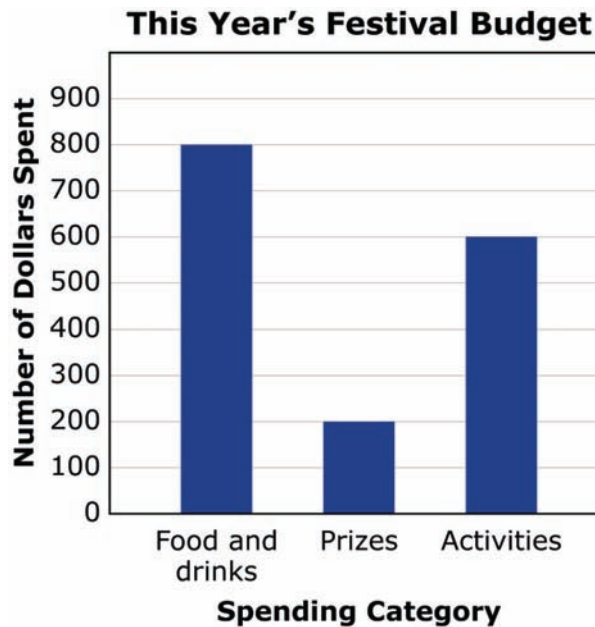


This year's festival budget has increased to $1600. This amount is 2 times what it was last year. If the fractions spent on each spending category need to stay the same, the amount in each category will also be 2 times what it was last year.

I checked myself to make sure that the amount in each spending category was 2 times the amount from last year in the same spending category. The number sentence below shows this.

$2(400) + 2(100) + 2(300) = 800 + 200 + 600 = 1600$

**Part B**

*Note to Principal:*

*For this year's festival, I have planned for 200 people. Our budget for food and drinks this year is $800. I have to buy food, drinks, plates, cups, and utensils. Plates, cups, and utensils are free to customers.*

*Although the hamburger plate for Restaurant B is less than the plate for Restaurant A, the total cost of using Restaurant B is more. For 200 people, it would cost $600. If I got lemonade, it would cost $75 for every 100 people. That would be $150 for 200 people. I added $600 and $150 to get $750. If I add the cost for a second drink choice, it would add another $150, which would take me over my food and drink budgeted amount.*

Sample Top-Score Response:

*I chose Restaurant A to prepare the taco meals. They charge $4 per person for this meal and provide lemonade. This would make the total charge $800, which is the budgeted amount. With this restaurant, I will get 2 drink choices for free. This is a better deal than Restaurant B.*

**Part C**

**Item Amounts**

$11\frac{1}{4}$ cups flour

5 teaspoons baking soda

5 teaspoons salt

5 cups butter

$3\frac{3}{4}$ cups white sugar

$3\frac{3}{4}$ cups brown sugar

10 eggs

10 cups chocolate chips

---

I know that there are 200 people coming to the festival. Each batch of cookies serves 40 people. I divided 200 by 40 to see how many batches of cookies needed to be made. Then I multiplied the amount of flour needed for one batch of cookies by 5.

$200 \div 40 = 5$

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

$5 \times \frac{9}{4} = \frac{45}{4}$

$45 \div 4 = 11\frac{1}{4}$

---

I know that there are 200 people coming to the festival. Each batch of cookies serves 40 people. I divided 200 by 40 to see how many batches of cookies needed to be made. Then I multiplied the amount of brown sugar in one serving by 5. The amount of white sugar is the same as the amount of brown sugar, so I just added the amount of brown sugar to itself. The total amount of sugar needed is $3\frac{3}{4}$ cups.

---

*Sample Top-Score Response:*

$200 \div 40 = 5$

$5 \times \dfrac{3}{4} = \dfrac{15}{4}$

$15 \div 4 = 3\dfrac{3}{4}$

---

**Part D**

| Activity | Start Time | End Time |
|---|---|---|
| Presentation by principal | 11:00 A.M. | 11:30 A.M. |
| Lunch | 11:30 A.M. | 1:00 P.M. |
| Student and teacher basketball game | 1:00 P.M. | 2:00 P.M. |
| Break | 2:00 P.M. | 2:15 P.M. |
| Band performance | 2:15 P.M. | 2:45 P.M. |
| Break | 2:45 P.M. | 3:00 P.M. |
| Games for prizes | 3:00 P.M. | 5:00 P.M. |

---

I started with 11:00 A.M. and then added the amounts of time until I got to the end of the last activity. My number sentences are below:

11:00 + 30 minutes = 11:30
11:30 + 90 minutes = 1:00
1:00 + 1 hour = 2:00
2:00 + 15 minutes = 2:15
2:15 + 30 minutes = 2:45
2:45 + 15 minutes = 3:00
3:00 + 2 hours = 5:00

I checked myself by subtracting my start time from my end time. The difference was 6 hours. This number is the same as all the durations added together.

Sample Top-Score Response:

**Part E**



$50    $50    $50    $50
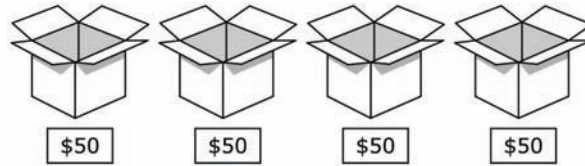
$200 divided by 4 boxes is $50 for each box.

$200 \div 4 = 50$



| 90 | Box 1 | ← | Fishing for Sharks |

| 90 | Box 2 | ← | Pie the Teacher |

| 90 | Box 3 | ← | Frog Jumping |

| 30 | 30 | 30 | Box 4 |

Fishing for Sharks    Pie the Teacher    Frog Jumping
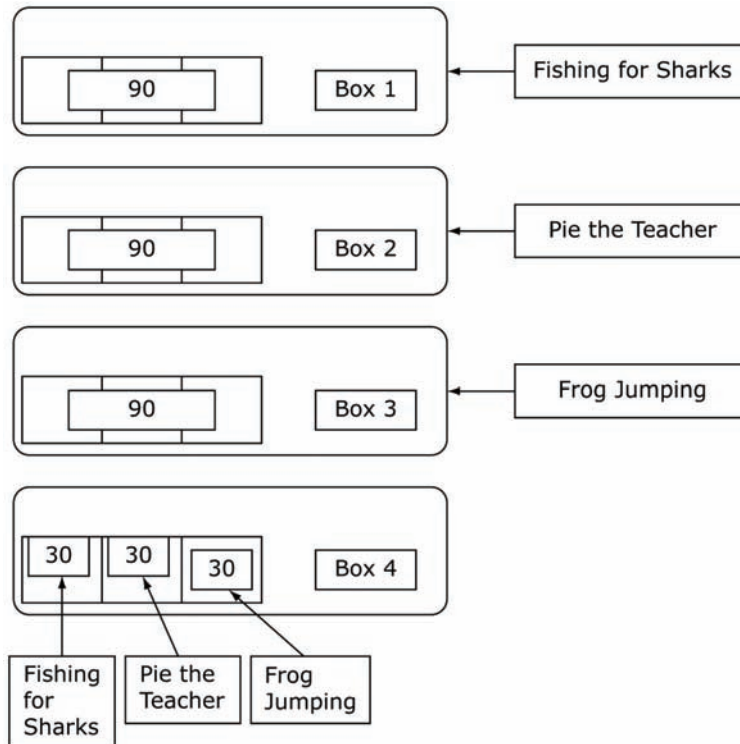
Each game will get 1 full box of 90 prizes. The last box will be divided by 3, with 30 prizes going to each game. That means each game will get a total of 120 prizes or $1\frac{1}{3}$ boxes of prizes.

*Scoring Rubric:*

**Part A**
**4 points:** The student provides a properly labeled bar graph showing correct amounts for each spending category. The student describes how she/he calculated the values shown in the graph and how each amount changed from the previous year.

**3 points:** The student provides a bar graph showing correct amounts for each spending category, but did not label it correctly. The student describes how she/he calculated the values shown in the graph or how each amount changed from the previous year.

**2 points:** The student provides a bar graph showing some incorrect amounts for each spending category. The student describes how she/he calculated the values shown in the graph or how each amount changed from the previous year.

**1 point:** The student provides a bar graph showing incorrect amounts for each spending category. The student describes how she/he calculated the values shown in the graph or how each amount changed from the previous year.

**0 points:** The student provides a bar graph showing incorrect amounts for each spending category. The student does not describe how she/he calculated the values shown in the graph or how each amount changed from the previous year. **OR** The student left *Part A* blank.

**Part B**
**4 points:** The student provides a letter that identifies his/her choice of restaurant, states that 200 people will attend the festival, clearly explains the calculations of a correct price for using the given restaurant, and clearly explains a logical determination of value for the selected restaurant.

**3 points:** The student provides a letter that identifies his/her choice of restaurant, states that 200 people will attend the festival, explains the calculations of a correct price for using the given restaurant, and explains a determination of value for the selected restaurant.

**2 points:** The student provides a letter that identifies his/her choice of restaurant, states that 200 people will attend the festival, explains the calculations of a correct price for using the given restaurant, but does not explain or makes no determination of value for the selected restaurant.

**1 point:** The student provides a letter that identifies his/her choice of restaurant, does not state that 200 people will attend the festival, explains the calculations of a price for using the given restaurant, and does not explain or makes no determination of value for the selected restaurant.

**0 points:** The student provides a letter that does not identify his/her choice of restaurant, does not state that 200 people will attend the festival, gives little or no explanation of the calculations of a price for using a restaurant, and makes a no determination of value for either restaurant. **OR** The student left *Part B* blank.

*Part C*
**4 points:** The student correctly provides the correct amounts for each ingredient in the shopping list. The student provides a clear explanation of how she/he got the correct amount of flour. The student provides a clear explanation of how she/he got the correct amount of brown sugar.

**3 points:** The student correctly provides the correct amounts for each ingredient in the shopping list. The student provides an explanation of how she/he got the correct amount of flour. The student provides an explanation of how she/he got the correct amount of brown sugar.

**2 points:** The student correctly provides the correct amounts for some ingredients in the shopping list. The student provides an explanation of how she/he got the correct amount of flour. The student provides an explanation of how she/he got the correct amount of brown sugar.

**1 point:** The student inconsistently applies a correct method of determining amounts of each ingredient. The student provides little or no explanation of how she/he got the correct amount of flour. The student gives little or no explanation of how she/he got the correct amount of brown sugar.

**0 points:** The student inconsistently applies a method to determine the amounts used for each ingredient in the shopping list. The student does not provide an explanation for the solution in the first response. The student does not provide an explanation of how she/he got the amount of brown sugar. **OR** The student left *Part C* blank.

*Part D*
**2 points:** The student correctly provides start and end times for each activity.

**1 point:** The student incorrectly provides start and end times for each activity, but the correct amount of elapsed time was used to determine the given times.

**0 points:** The student provides incorrect start and end times for most or all activities with inconsistent application of elapsed time. **OR** The student left *Part D* blank.

*Part E*
**4 points:** The student identifies a $50 price for each box of prizes. The student clearly explains a division problem to show how $50 is the quotient. The student draws a model that clearly shows how each box represents prizes that will be evenly distributed among the 3 games.

**3 points:** The student identifies a $50 price for each box of prizes. The student uses a division problem to show how $50 is the quotient. The student draws a model that shows how each box represents prizes that will be evenly distributed among the 3 games.

**2 points:** The student identifies a $50 price for each box of prizes. The student uses a division problem to show how $50 is the quotient or draws a model that shows how each box represents prizes that will be evenly distributed among the 3 games.

**1 point:** The student identifies a $50 price for each box of prizes. The student uses a division problem in an explanation of an incorrect quotient or draws a model that inaccurately or ineffectively shows how each box represents prizes for 3 games.

**0 points:** The student does not identify a $50 price for each box of prizes. The student uses a division problem incorrectly in an explanation. The student draws a model that inaccurately or ineffectively shows how each box represents prizes for 3 games.
**OR** The student left *Part E* blank.

# MAT.05.PT.4.STORG.A.413 Claim 4

| | |
|---|---|
| Sample Item ID: | MAT.05.PT.4.STORG.A.413 |
| Title: | Storage Facility |
| Grade: | 05 |
| Primary Claim: | **Claim 4: Modeling and Data Analysis**<br>Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems. |
| Secondary Claim(s): | Claim 1: Conceptual Understanding and Procedural Fluency Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency. |
| Primary Content Domain | **Measurement and Data** |
| Secondary Content Domain(s): | Operations and Algebraic Thinking<br>Number and Operations in Base Ten<br>Geometry |
| Assessment Target(s): | 4 A: Apply mathematics to solve problems arising in everyday life, society, and the workplace.<br><br>4 B: Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem.<br><br>4 D: Interpret results in the context of a situation.<br><br>4 E: Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.<br><br>1 D: Perform operations with multi-digit whole numbers and with decimals to hundredths.<br><br>1 I: Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition. |
| Standard(s): | 5.OA.3, 5.NBT.7, 5.MD.3, 5.MD.5, 4.OA.5, 4.MD.3, 3.MD.6, 3.MD.7 |
| Mathematical Practice(s): | 1, 2, 4 |
| DOK: | 3 |
| Item Type: | PT |
| Score Points: | 17 |
| Difficulty: | H |
| How this task addresses the "sufficient evidence" for this claim: | The student uses problem-solving strategies to organize the area of rectangles within a given amount of space. The student uses numeric operations to find the volume of rectangular prisms, the monthly cost, and the average cost per unit. The student justifies why the original mathematical model is insufficient and makes improvements given the original data. Finally, the student uses problem-solving strategies based upon the new data he/she created to answer various mathematical concepts. |

| Target-specific attributes (e.g., accessibility issues): | Accommodations may be necessary for students with fine- motor-skill challenges and language-processing challenges. |
|---|---|
| Stimulus/Source: | http://www.publicstorage.com |
| Notes: | Multi-part task |
| Task Overview: | Students must perform various calculations in order to find the lowest cost for a specified amount of volume using fixed storage space dimensions. |
| Teacher preparation / Resource requirements: | None |
| Teacher Responsibilities During Administration: | Monitor individual student work |
| Time Requirements: | Two sessions totaling no more than 120 minutes. *Part A* and *Part B* should be completed in Session 1. *Parts C* through *Part E* should be completed in Session 2. |

| Prework:   (May be blank) |
|---|

# Storage Facility

The owner of an empty building wants to construct walls to divide the building into individual storage units. All the space in the building will be used for the storage units. Each storage unit will have a door on the outside (perimeter) of the building.

## *Part A*
## Design the Storage Building

The grid that follows represents the rectangular floor of the building. Draw lines on the grid to divide the floor into 9 individual storage units.

The following rules apply:

- Each unit must have a rectangular floor.
- Each unit will share one side with the outside edge (perimeter) of the building.
- The storage units must not overlap.

The sizes of the storage units and the number of each size that must be included in the drawing are shown in the following table.

| Dimensions of Floor (in feet) | Number of Storage Units in Building |
|---|---|
| 5 by 5 | 1 |
| 5 by 10 | 2 |
| 5 by 15 | 1 |
| 10 by 10 | 2 |
| 10 by 15 | 1 |
| 10 by 20 | 1 |
| 10 by 25 | 1 |

[Note: Instructions for creating lines using tools on the computer will be provided as necessary.]
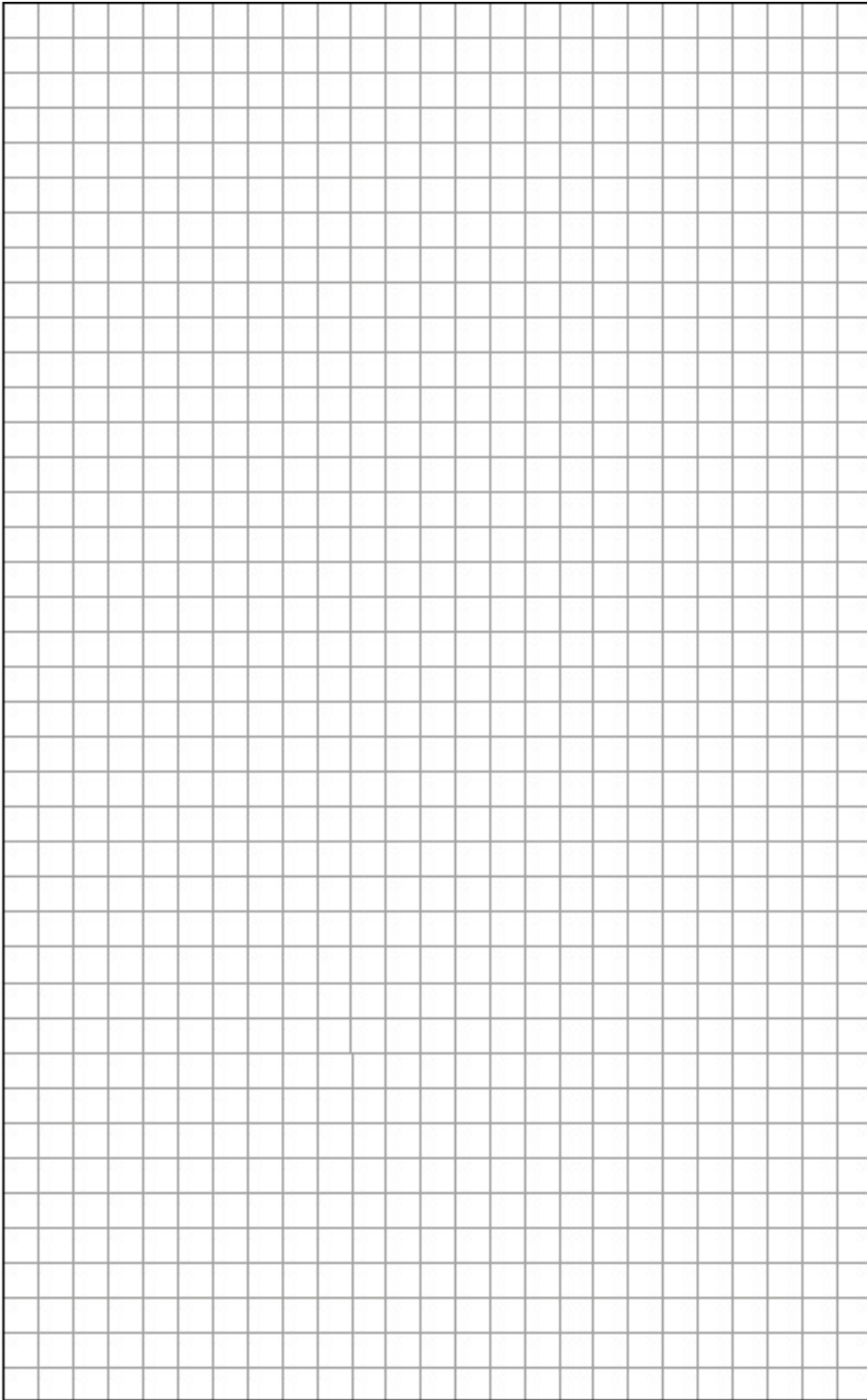
SCALE

⊢—⊣ = 1 foot

*Part B*

## Determine the Monthly Rent

The building owner needs to determine the amount of monthly rent he will charge his customers for each individual storage unit. He wants to charge a fixed amount for each cubic foot of volume in the storage units.

Complete the table below to find the volume of each storage unit and the cost of monthly rent for each unit based on the volume.

| Dimensions of Floor (in feet) | Height of Storage Unit (in feet) | Volume of Storage Unit (in cubic feet) | Monthly Rent |
|---|---|---|---|
| 5 by 5 | 10 | 250 | $30 |
| 5 by 10 | 10 | | |
| 5 by 15 | 10 | | |
| 10 by 10 | 10 | 1000 | $120 |
| 10 by 15 | 10 | | |
| 10 by 20 | 10 | | |
| 10 by 25 | 10 | | |

You will not be able to return to *Parts A* and *B* after completing the table and clicking "submit."

## End of Session 1

## Session 2

*Part C*

**Recalculating the Monthly Rents**

The completed table from *Part B* is shown below.

| Dimensions of Floor (in feet) | Height of Storage Unit (in feet) | Volume of Storage Unit (in cubic feet) | Monthly Rent |
|---|---|---|---|
| 5 by 5 | 10 | 250 | $30 |
| 5 by 10 | 10 | 500 | $60 |
| 5 by 15 | 10 | 750 | $90 |
| 10 by 10 | 10 | 1000 | $120 |
| 10 by 15 | 10 | 1500 | $180 |
| 10 by 20 | 10 | 2000 | $240 |
| 10 by 25 | 10 | 2500 | $300 |

The building owner determined that some of the monthly rents in *Part B* are not reasonable. He wants the cost for each cubic foot of volume to decrease as the volume of the storage unit increases.

In the table below, the owner decided to charge $0.12 for each cubic foot of volume in **only** the smallest storage unit.

- Complete the table by determining a cost for each cubic foot of volume and a corresponding monthly rent for each individual storage unit.
- Make sure the **cost** for each cubic foot **decreases** as the volume of the storage unit increases.
- Make sure the monthly **rent increases** as the **volume** of the storage unit **increases**.

| Dimensions of Floor (in feet) | Volume of Storage Unit (in cubic feet) | Cost for each Cubic Foot of Volume | Monthly Rent |
|---|---|---|---|
| 5 by 5 | 250 | $0.12 | $30 |
| 5 by 10 | 500 | | |
| 5 by 15 | 750 | | |
| 10 by 10 | 1000 | | |
| 10 by 15 | 1500 | | |
| 10 by 20 | 2000 | | |
| 10 by 25 | 2500 | | |

## *Part D*

## Total Monthly Rent Collected

The table of storage unit sizes from *Part A* is shown below.

| Dimensions of Floor (in feet) | Number of Storage Units in Building |
|---|---|
| 5 by 5 | 1 |
| 5 by 10 | 2 |
| 5 by 15 | 1 |
| 10 by 10 | 2 |
| 10 by 15 | 1 |
| 10 by 20 | 1 |
| 10 by 25 | 1 |

What is the total amount of monthly rent, in dollars, the owner should collect using the table shown at the beginning of Session 2 (*Part B* completed table)?

$ [                    ]

Use mathematics to justify your answer.

What is the total amount of monthly rent, in dollars, the owner should collect using the **adjusted** rent amounts from your completed table in *Part C*? Use mathematics to justify your answer.

$ [                    ]

Identify one reason why the owner might choose to use your monthly rent table from *Part C* instead of the monthly rent table from *Part B*.

*Part E*

## Customer Advice

Ms. Prater is the first customer to rent storage units in the building. She needs a total of 4000 cubic feet of space. In the space below, make a recommendation to Ms. Prater about which storage units she should rent. Use the table from *Part C* to calculate the total rent on the storage units you chose.

Justify why you chose the combination of storage units that you did using mathematics and/or words.

**End of Session 2**

*Sample Top-Score Response:*

**Part A**

The grid is divided into correctly sized and labeled rectangles. None of the rectangles overlap, and every rectangle shares at least one side with the outside edge of the grid. A possible response is shown below.
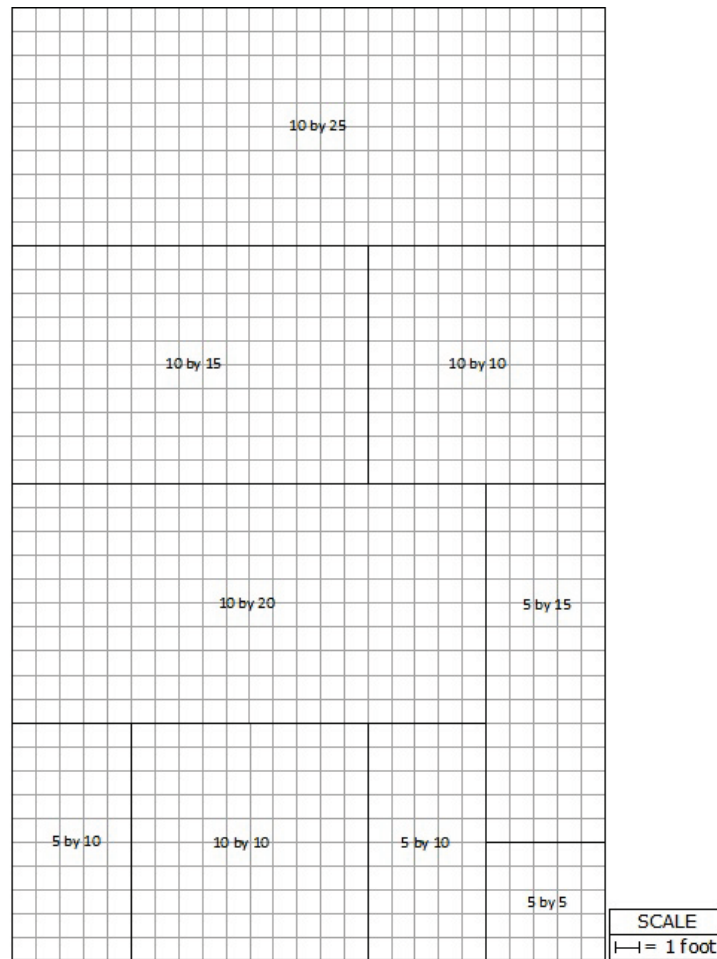


**Part B**

The student completes the table as shown.

| Dimensions of Floor (in feet) | Height of Storage Unit (in feet) | Volume of Storage Unit (in cubic feet) | Monthly Rent |
|---|---|---|---|
| 5 by 5 | 10 | 250 | $30 |
| 5 by 10 | 10 | 500 | $60 |
| 5 by 15 | 10 | 750 | $90 |
| 10 by 10 | 10 | 1000 | $120 |
| 10 by 15 | 10 | 1500 | $180 |
| 10 by 20 | 10 | 2000 | $240 |
| 10 by 25 | 10 | 2500 | $300 |

### Part C
The student completes the table. The entries in the "Monthly Rent" column should **_increase_** from top to bottom and the "Cost for Each Cubic Foot of Volume" entries should **_decrease_** from top to bottom. A possible correct response is shown.

| Dimensions of Floor (in feet) | Volume of Storage Unit (in cubic feet) | Cost for Each Cubic Foot of Volume | Monthly Rent |
|---|---|---|---|
| 5 by 5 | 250 | $0.12 | $30 |
| 5 by 10 | 500 | $0.11 | $55 |
| 5 by 15 | 750 | $0.10 | $75 |
| 10 by 10 | 1000 | $0.09 | $90 |
| 10 by 15 | 1500 | $0.08 | $120 |
| 10 by 20 | 2000 | $0.07 | $140 |
| 10 by 25 | 2500 | $0.06 | $150 |

### Part D
The student writes $1200 and shows work needed to arrive at this answer.

The student correctly computes the total rent collected for the table he/she created in *Part C*. The total should be the sum of the monthly rents plus the rent amounts in the second and fourth rows. For the sample table shown above, this total would be $805.

The student identifies and explains one reason why the building owner would choose the table in *Part C*, such as, "The rent costs less for most of the storage units so it might be easier to rent them to customers." **OR** "The customers who need more space will pay less for each cubic foot of volume."

### Part E
The student chooses a combination of storage units that have a total volume of 4000 cubic feet. Possible combinations are shown below.

    2500 cubic feet + 1500 cubic feet
    2500 cubic feet + 1000 cubic feet + 500 cubic feet
    2500 cubic feet + 750 cubic feet + 500 cubic feet + 250 cubic feet
    2000 cubic feet + 1500 cubic feet + 500 cubic feet
    2000 cubic feet + 2 x 1000 cubic feet
    2000 cubic feet + 1000 cubic feet + 750 cubic feet + 250 cubic feet
    2000 cubic feet + 1000 cubic feet + 2 x 500 cubic feet
    2000 cubic feet + 750 cubic feet + 2 x 500 cubic feet + 250 cubic feet
    1500 cubic feet + 2 x 1000 cubic feet + 500 cubic feet
    1500 cubic feet + 1000 cubic feet + 750 cubic feet + 500 cubic feet + 250 cubic feet
    2 x 1000 cubic feet + 750 cubic feet + 2 x 500 cubic feet +250 cubic feet

The student should calculate the correct total rent based on their completed table from *Part D*.

The student should justify that the combination he/she chose results in the lowest total monthly rent. (Note: The student does not need to calculate the total monthly rent for each

combination above). In most cases, the lowest monthly rent should result from the combination of the 2500 cubic foot storage unit and the 1500 cubic foot storage unit.

*Scoring Notes:*

Each part of the task is evaluated individually. The total number of points is determined by adding the points assigned for each part.

---

*Scoring Rubric:*

*Responses to this item will receive 0-17 points, based on the following:*

**Part A**
**4 points:** Thorough understanding of rectangle area and dimensions. Thorough understanding of the given directions. The student correctly divided the grid into 9 non-overlapping rectangles of the appropriate sizes. The student correctly labeled each rectangle with its dimensions. The student divided the grid so that each smaller rectangle shares at least one side with the outer edge of the grid.

**3 points:** Partial understanding of rectangle area and dimensions. Partial understanding of the given directions. The student correctly divided the grid into 9 rectangles of the appropriate sizes. The student labeled each rectangle with its dimensions. The student may not have divided the grid so that each smaller rectangle shares at least one side with the outer edge of the grid.

**2 points:** Partial understanding of rectangle area and dimensions. Partial understanding of the given directions. The student divided the grid into 9 rectangles of the appropriate sizes. The student labeled each rectangle with its dimensions. The rectangles may not completely fill the grid or may not represent the sizes given in the directions. The student may not have divided the grid so that each smaller rectangle shares at least one side with the outer edge of the grid.

**1 point:** Limited understanding of rectangle area and dimensions. Limited understanding of the given directions. The student divided the grid into fewer than 9 rectangles of the appropriate sizes. The student correctly labeled each rectangle with its dimensions. Some of the rectangles may be overlapping. The student may not have divided the grid so that each smaller rectangle shares at least one side with the outer edge of the grid.

**0 points:** No understanding of rectangle area and dimensions. No understanding of the given directions. The student may have not divided the grid or divided the grid into nonrectangular sections or rectangular sections of incorrect sizes.

**Part B**
**3 points:** Thorough understanding of calculating the volume of a rectangular prism. Thorough understanding of calculating the monthly rent based on a fixed cost for each cubic foot of space. The student correctly filled in at least 8 of the cells in the table (may have calculated one volume incorrectly and the associated monthly rent incorrectly).

**2 points:** Thorough understanding of calculating the volume of a rectangular prism. Limited

understanding of calculating the monthly rent based on a fixed cost for each cubic foot of space. The student correctly filled in at least 4 of the cells in the first column of the table. **OR** Limited understanding of calculating the volume of a rectangular prism. Thorough understanding of calculating the monthly rent based on a fixed cost for each cubic foot of space. The student correctly filled in at least 4 of the cells in the second column of the table based on the incorrect values in the first column and the given monthly rents.

**1 point:** Partial understanding of calculating the volume of a rectangular prism. Limited understanding of calculating the monthly rent based on a fixed cost for each cubic foot of space. The student correctly filled in at least 3 of the missing volumes in the table but did not correctly calculate the associated monthly rents. **OR** Limited understanding of calculating the volume of a rectangular prism. Partial understanding of calculating the monthly rent based on a fixed cost for each cubic foot of space. The student incorrectly filled in at least 3 of the missing volumes in the table but correctly calculated the associated monthly rents.

**0 points:** No understanding of calculating the volume of a rectangular prism. No understanding of calculating the monthly rent based on a fixed cost for each cubic foot of space.


*Part C*
**3 points:** Thorough understanding of multiplying a decimal by a whole number to calculate the monthly rent for each storage unit size. Thorough understanding of selecting values that demonstrate increasing and decreasing trends as given in the directions. The student correctly provided values in the third column that decrease from top to bottom and used them to calculate correctly the values in the fourth column, which must increase from top to bottom.

**2 points:** Thorough understanding of multiplying a decimal by a whole number to calculate the monthly rent for each storage unit size. Partial understanding of selecting values that demonstrate increasing and decreasing trends as given in the directions. The student provided values in the third column that do not decrease from top to bottom, but used them to calculate correctly the values in the fourth column.

**1 point:** Limited understanding of multiplying a decimal by a whole number to calculate the monthly rent for each storage unit size. Limited understanding of selecting values that demonstrate increasing and decreasing trends as given in the directions. The student provided some values in the third column that decrease from top to bottom. The student calculated at least one value in the fourth column based on the associated value chosen for the third column. **OR** Partial understanding of multiplying a decimal by a whole number to calculate the monthly rent for each storage unit size. Thorough understanding of selecting values that demonstrate increasing and decreasing trends as given in the directions. The student correctly provided values in the third column that decrease from top to bottom, but did not use them to calculate correctly the values in the fourth column.

**0 points:** No understanding of multiplying a decimal by a whole number to calculate the monthly rent for each storage unit size. No understanding of selecting values that demonstrate increasing and decreasing trends as given in the directions.

*Part D*
**4 points:** Thorough understanding of combining information from different tables to calculate the total monthly rent for the building. Thorough understanding of the preference for a rent table not based on a fixed cost for each cubic foot of space. The student provided a correct total amount of monthly rent for *Part B* and *Part C* (based upon the values calculated by the student in the fourth column of the table in *Part C)*. The student explains why a rent table that is not based on a fixed cost for each cubic foot of space is preferable.

**3 points:** Partial understanding of combining information from different tables to calculate the total monthly rent for the building. Thorough understanding of the preference for a rent table not based on a fixed cost for each cubic foot of space. The student provided an incorrect total amount of monthly rent for *Part B* and *Part C* (based upon the values calculated by the student in the fourth column of the table in *Part C*) by not including the two storage unit sizes that are represented twice. **OR** The student provided a correct total amount of monthly rent for *Part B* or *Part C*. The student explains why a rent table that is not based on a fixed cost for each cubic foot of space is preferable.

**2 points:** Partial understanding of combining information from different tables to calculate the total monthly rent for the building. Understanding of the preference for a rent table not based on a fixed cost for each cubic foot of space is not adequately demonstrated. The student may have provided an incorrect total amount of monthly rent for *Part B* or *Part C* (based upon the values calculated by the student in the fourth column of the table in *Part C*). The student provides a reason why the owner might choose the monthly rent table from *Part C*, but the reason may not be convincing.

**1 point:** Limited understanding of combining information from different tables to calculate the total monthly rent for the building. Limited understanding of the preference for a rent table not based on a fixed cost for each cubic foot of space. The student provided an incorrect total amount of monthly rent for only one table in *Part B* or *Part C* (based upon the values calculated by the student in the fourth column of the table in *Part C*) by not including the two storage unit sizes that are represented twice. The student provides a reason why the owner might choose the monthly rent table from *Part C*, but the reason may not be convincing.

**0 points:** No understanding of combining information from different tables to calculate the total monthly rent for the building. No understanding of the preference for a rent table not based on a fixed cost for each cubic foot of space. The student provided an incorrect total amount of monthly rent for both tables in *Part B* and *Part C*. The student may provide a reason why the owner might choose the monthly rent table from *Part C*, but the reason is flawed.


*Part E*
**3 points:** Thorough understanding of adding volumes. Thorough understanding that storage units with greater volumes cost less for each cubic foot of space. The student selected two or more storage units that have a combined volume of exactly 4000 cubic feet. The student shows work to indicate that more than one combination of storage units was considered, but the combination chosen was the one that results in the lowest total monthly rent (in most cases, this should be the 2500-square-foot and 1500-square-foot storage units). The student justifies the selection by explaining that the storage units with greater volumes cost less for each cubic foot of space.

**2 points:** Thorough understanding of adding volumes. Partial understanding that storage units with greater volumes cost less for each cubic foot of space. The student selected two or more storage units that have a combined volume of exactly 4000 cubic feet. The student shows work to indicate that more than one combination of storage units was considered, but the combination chosen was one that results in one of the lowest total monthly rent. The student does not justify the selection.

**1 point:** Partial understanding of adding volumes. Limited understanding that storage units with greater volumes cost less for each cubic foot of space. The student selected two or more storage units that have a combined volume of exactly 4000 cubic feet. The combination chosen does not result in the lowest total monthly rent. The student does not justify the selection.

**0 points:** No understanding of adding volumes. No understanding that storage units with greater volumes cost less for each cubic foot of space. The student selected two or more storage units that do not have a combined volume of exactly 4000 cubic feet. The student does not justify the selection.

## MAT.05.SR.1.000NF.E.008 C1 T1

| | |
|---|---|
| Sample Item ID: | MAT.05.SR.1.000NF.E.008 |
| Grade: | 05 |
| Claim(s): | **Claim 1: Concepts and Procedures**<br>Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Assessment Target(s): | 1 E: Use equivalent fractions as a strategy to add and subtract fractions. |
| Content Domain: | Number and Operations – Fractions |
| Standard(s): | 5.NF.1, 5.NF.2 |
| Mathematical Practice(s): | 2, 4, 6 |
| DOK: | 1 |
| Item Type: | SR |
| Score Points: | 2 |
| Difficulty: | M |
| Key: | YNNY |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., Accessibility Issues): | |
| Notes: | Multi-part item |

In the morning John hiked $4\frac{8}{10}$ miles. In the afternoon he hiked $2\frac{1}{2}$ miles. How many miles did John hike altogether?

For numbers 1a – 1d, select Yes or No to indicate whether each equation can be used to solve the word problem shown above.

1a.　$4\frac{8}{10} + 2\frac{5}{10} = \square$　　　　Yes ○　　　　No ○

1b.　$4\frac{8}{10} + 2\frac{1}{10} = \square$　　　　Yes ○　　　　No ○

1c.　$\frac{40}{10} + \frac{20}{10} = \square$　　　　Yes ○　　　　No ○

1d.　$\frac{48}{10} + \frac{25}{10} = \square$　　　　Yes ○　　　　No ○

*Scoring Rubric:*

*Responses to this item will receive 0-2 points, based on the following:*

2 pts – YNNY – Thoroughly understands how to set up an addition problem by changing mixed numerals with unlike denominators to mixed numerals with like denominators or to equivalent improper fractions with like denominators.

1 pt – YNNN, NNNY – Recognizes one equivalent addition problem with like denominators, but not both forms (mixed numerals and improper fractions).

0 pts – YYYY, YYYN, YNYY, NYYY, YNYY, YYNY, YYNN, YNYN, NYNY, NNYY, NNYN, NYNN, NNNN – Shows inconsistent or no understanding of how to set up an addition problem with like denominators.

# MAT.05.SR.1.000NF.F.007 C1 T1

| | |
|---|---|
| Sample Item ID: | MAT.05.SR.1.000NF.F.007 |
| Grade: | 05 |
| Claim(s): | **Claim 1: Concepts and Procedures**<br>Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Assessment Target(s): | 1 F: Apply and extend previous understandings of multiplication and division to multiply and divide fractions. |
| Content Domain: | Number and Operations – Fractions |
| Standard(s): | 5.NF.6 |
| Mathematical Practice(s): | 2, 4, 6 |
| DOK: | 1 |
| Item Type: | SR |
| Score Points: | 1 |
| Difficulty: | M |
| Key: | C |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., Accessibility Issues): | Fractions may use any denominator that is a multiple of 2, 3, 5, and/or 7 and less than or equal to 100. |
| Notes: | |

---

Kevin uses $1\frac{1}{4}$ cups of milk to make 1 cake. What is the total amount of milk Kevin needs to make 6 of these cakes?

A.    6  cups

B.    $6\frac{1}{4}$ cups

C.    $7\frac{1}{2}$ cups

D.    9  cups

---

*Key and Distractor Analysis:*

A.  when converting mixed numbers into a fraction, student multiplies 1 times 4 times 1 to get numerator ($\frac{4}{4}$ times 6)

B.  multiplies whole numbers only (1 times 6, leaves $\frac{1}{4}$ alone)

C.  key
D.  fact error when multiplying 5 and 6 (gets 36 instead of 30)

## MAT.05.SR.1.000NF.F.019 C1 T1

| | |
|---:|:---|
| Sample Item ID: | MAT.05.SR.1.000NF.F.019 |
| Grade: | 05 |
| Claim(s): | **Claim 1: Concepts and Procedures**<br>Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Assessment Target(s): | 1 F: Apply and extend previous understandings of multiplication and division to multiply and divide fractions. |
| Content Domain: | Number and Operations—Fractions |
| Standard(s): | 5.NF.5 |
| Mathematical Practice(s): | 2 |
| DOK: | 2 |
| Item Type: | SR |
| Score Points: | 1 |
| Difficulty: | M |
| Key: | 1a. <    1b.  > |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., Accessibility Issues): | |
| Notes: | |

For 1a-1b, select the symbol (<, >, or =) that should be placed in the box ☐ to make each statement true.

1a. $\left(372 \times \dfrac{5}{5}\right)$ ☐ $\left(372 \times \dfrac{8}{5}\right)$     ○ <     ○ >     ○ =

1b. $\left(372 \times \dfrac{5}{5}\right)$ ☐ $\left(372 \times \dfrac{1}{5}\right)$     ○ <     ○ >     ○ =

Smarter
Balanced
*Assessment Consortium*

## MAT.05.SR.1.000NF.F.020 C1 TF

| | |
|---|---|
| Sample Item ID: | MAT.05.SR.1.000NF.F.020 |
| Grade: | 05 |
| Claim(s): | **Claim 1: Concepts and Procedures**<br>Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Assessment Target(s): | 1 F: Apply and extend previous understandings of multiplication and division to multiply and divide fractions. |
| Content Domain: | Number and Operations—Fractions |
| Standard(s): | 5.NF.3 |
| Mathematical Practice(s): | 1, 2 |
| DOK: | 2 |
| Item Type: | SR |
| Score Points: | 1 |
| Difficulty: | L |
| Key: | B |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., accessibility issues): | |
| Notes: | |

A carpenter used exactly 25 feet of wood to make 9 shelves of equal length. Each shelf measured between —

Ⓐ    1 and 2 feet.
Ⓑ    2 and 3 feet.
Ⓒ    3 and 4 feet.
Ⓓ    4 and 5 feet.

*Key and Distractor Analysis:*

A    Knows both values would result in answers less than 25 when multiplied by 9
B    Key
C    9 times 3 is close to 25
D    Computation error; may have used 6 rather than 9

## MAT.05.SR.1.000NF.F.025 C1 TF

| | |
|---:|:---|
| Sample Item ID: | MAT.05.SR.1.000NF.F.025 |
| Grade: | 05 |
| Claim(s): | **Claim 1: Concepts and Procedures**<br>Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Assessment Target(s): | 1 F: Apply and extend previous understandings of multiplication and division to multiply and divide fractions. |
| Content Domain: | Number and Operations—Fractions |
| Standard(s): | 5.NF.5 |
| Mathematical Practice(s): | 2 |
| DOK: | 2 |
| Item Type: | SR |
| Score Points: | 1 |
| Difficulty: | M |
| Key: | NYYN |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., accessibility issues): | |
| Notes: | Multi-part item |

For numbers 1a-1d, select Yes or No to indicate whether or not the statement is true about the product of 450 and $\frac{1}{3}$.

1a.  The product is less than $350 \times \frac{1}{3}$.  ○ Yes  ○ No

1b.  The product is greater than $350 \times \frac{1}{3}$.  ○ Yes  ○ No

1c.  The product is less than 450.  ○ Yes  ○ No

1d.  The product is greater than 450.  ○ Yes  ○ No

*Key:*

1a.    No
1b.    Yes
1c.    Yes
1d.    No

## MAT.05.SR.1.000NF.F.026 C1 TF

| | |
|---|---|
| Sample Item ID: | MAT.05.SR.1.000NF.F.026 |
| Grade: | 05 |
| Claim(s): | **Claim 1: Concepts and Procedures**<br>Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Assessment Target(s): | 1 F: Apply and extend previous understandings of multiplication and division to multiply and divide fractions. |
| Content Domain: | Number and Operations – Fractions |
| Standard(s): | 5.NF.5 |
| Mathematical Practice(s): | 2 |
| DOK: | 1 |
| Item Type: | SR |
| Score Points: | 1 |
| Difficulty: | M |
| Key: | YNN |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., accessibility issues): | Fractions may use any denominator that is a multiple of 2, 3, 5, and/or 7 and less than or equal to 100. |
| Notes: | Multi-part item |

For numbers 1a-1c, select Yes or No to indicate whether each fraction can be placed in the box to make a true inequality.

$$\frac{3}{4} \times \boxed{\phantom{x}} > \frac{3}{4}$$

1a. $\dfrac{12}{9}$      O Yes     O No

1b. $\dfrac{9}{9}$      O Yes     O No

1c. $\dfrac{9}{12}$      O Yes     O No

*Key and Distractor Analysis:*

1a. Y $\left( \dfrac{3}{4} \times \dfrac{12}{9} = \dfrac{3}{3} = 1 \right)$

1b. N $\left( \dfrac{3}{4} \times \dfrac{9}{9} = \dfrac{9}{12} = \dfrac{3}{4} \right)$

1c. N $\left( \dfrac{3}{4} \times \dfrac{9}{12} = \dfrac{9}{16} \right)$

## MAT.05.SR.1.000NF.F.257 C1 TF

| Sample Item ID: | MAT.05.SR.1.000NF.F.257 |
|---|---|
| Grade: | 05 |
| Claim(s): | **Claim 1: Concepts and Procedures**<br>Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Assessment Target(s): | 1 F: Apply and extend previous understandings of multiplication and division to multiply and divide fractions. |
| Content Domain: | Number and Operations – Fractions |
| Standard(s): | 5.NF.4, 5.NF.6 |
| Mathematical Practice(s): | 1, 2, 6 |
| DOK: | 2 |
| Item Type: | SR |
| Score Points: | 1 |
| Difficulty: | H |
| Key: | C |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., accessibility issues): | Alternate symbols for students may be necessary for visually-impaired students. |
| Notes: | |

At Montgomery Elementary, $\frac{3}{5}$ of the students in the fifth grade are 10 years old. Among the 10 year-old students, $\frac{2}{3}$ are girls. In the diagrams below:



-  represents a 10 year-old girl

-  represents a student who is not a 10 year-old girl

Which diagram represents the fraction of the fifth grade students who are 10 year-old girls at Montgomery Elementary?

Ⓐ

*Key and Distractor Analysis:*

A.   Doesn't understand multiplying fractions.

B.   One of the fractions.

C.   Key

D.   Shows 3 to 5 and 2 to 3.

# MAT.05.SR.2.000NF.A.552 Claim 2

| Sample Item ID: | MAT.05.SR.2.000NF.A.552 |
| --- | --- |
| Grade: | 05 |
| Primary Claim: | **Claim 2: Problem Solving**<br>Students can solve a range of well-posed problems in pure and applied mathematics, making productive use of knowledge and problem-solving strategies. |
| Secondary Claim(s): | Claim 1: Concepts and Procedures<br>Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency. |
| Primary Content Domain: | Numbers and operations – Fractions |
| Secondary Content Domain(s): | |
| Assessment Target(s): | 2 A: Apply mathematics to solve well-posed problems arising in everyday life, society, and the workplace.<br><br>1 E: Use equivalent fractions as a strategy to add and subtract fractions. |
| Standard(s): | 5.NF.1, 5.NF.2, 5.NF.6 |
| Mathematical Practice(s): | 1, 2, 4, 6 |
| DOK: | 2 |
| Item Type: | SR |
| Score Points: | 1 |
| Difficulty: | M |
| Key: | C |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., accessibility issues): | |
| Notes: | |

On Sunday, Travis bought the carton of eggs pictured below.
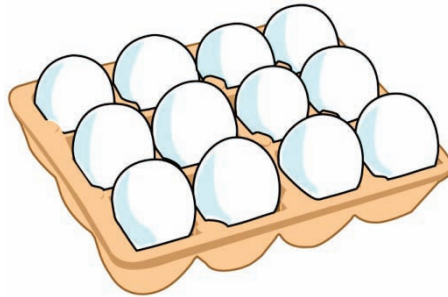


- On Monday, Travis used $\frac{1}{4}$ of the eggs in the carton.

- On Tuesday, Travis used $\frac{2}{3}$ of the eggs that **remained** in the carton after Monday.

Which picture represents the number of eggs remaining in the carton after Travis used eggs on Tuesday?

A

C

B

D
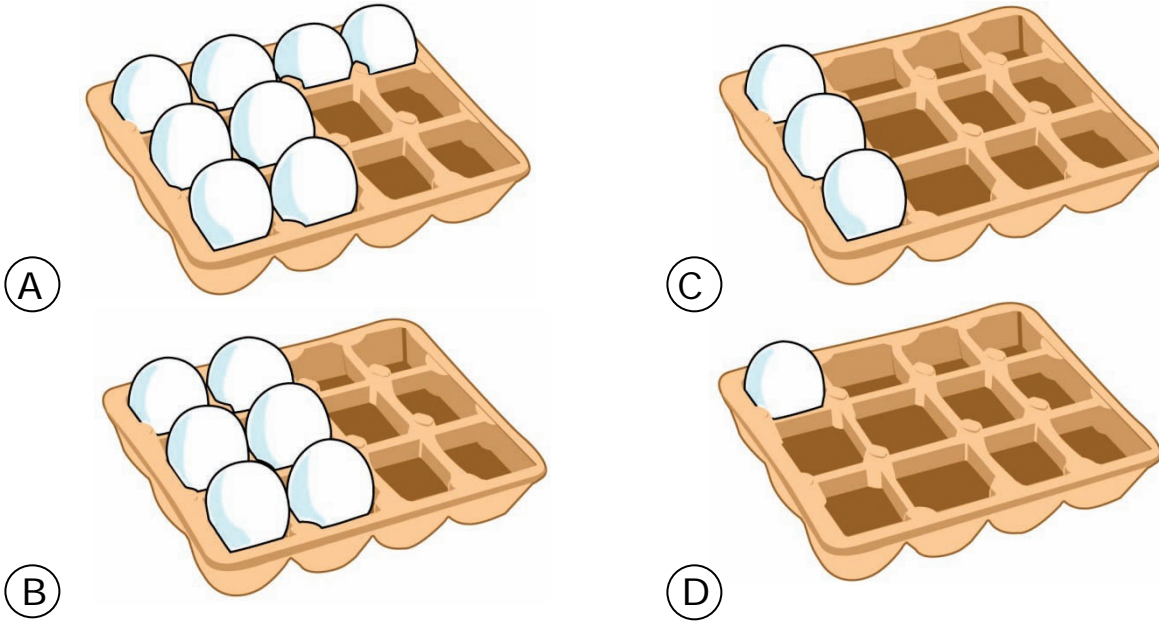
Key and Distractor Analysis:

A. Disregarded first bullet and multiplied 2/3 by 12
B. Found number used on Tuesday
C. Correct
D. Added 1/4 and 2/3 and subtracted from 12/12.

# MAT.05.TE.1.0000G.J.252 C1 TJ

| | |
|---|---|
| Sample Item ID: | MAT.05.TE.1.0000G.J.252 |
| Grade: | 05 |
| Claim(s): | **Claim 1: Concepts and Procedures**<br>Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Assessment Target(s): | 1 J: Graph points on the coordinate plane to solve real-world and mathematical problems. |
| Content Domain: | Geometry |
| Standard(s): | 5.G.2 |
| Mathematical Practice(s): | 1, 6 |
| DOK: | 1 |
| Item Type: | TE |
| Score Points: | 1 |
| Difficulty: | L |
| Key: | See Sample Top-Score Response. |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., accessibility issues): | |
| Notes: | Placing Points TE template |

Plot the following three points on the *xy*-plane below. Plot each point by clicking on its location on the plane.

- $(4, 4)$
- $(7, 3)$
- $(0, 6)$
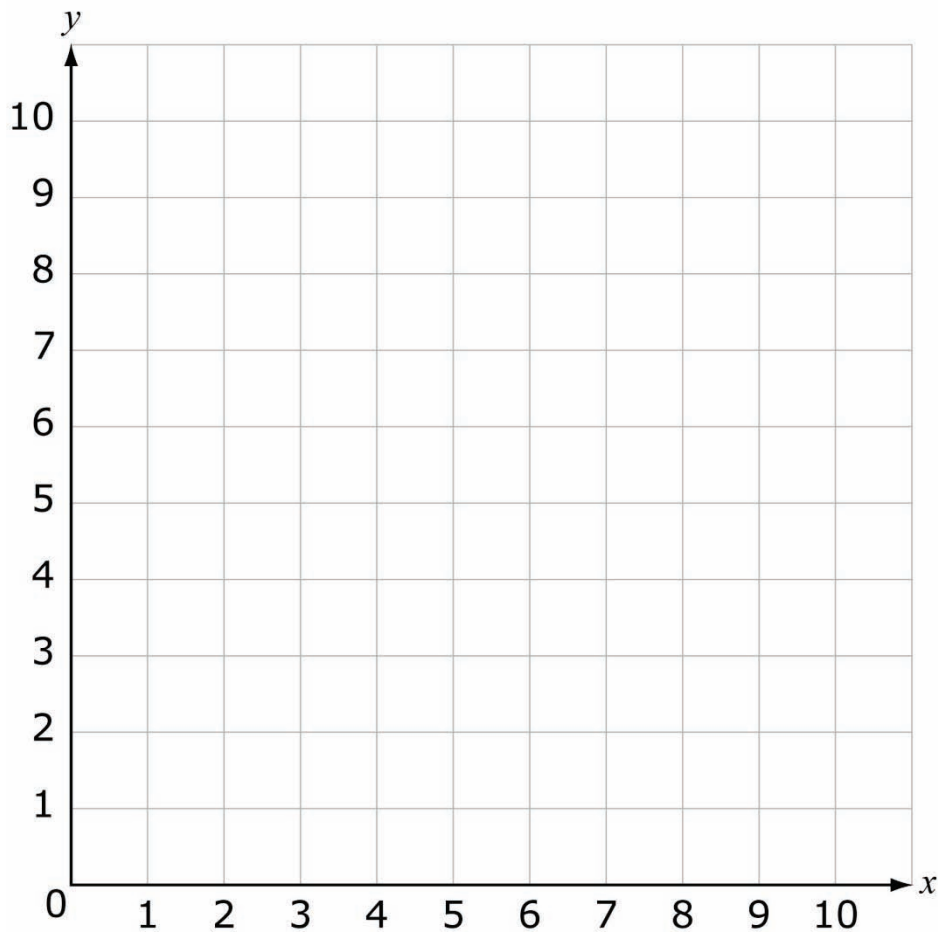
*Sample Top-Score Response:*
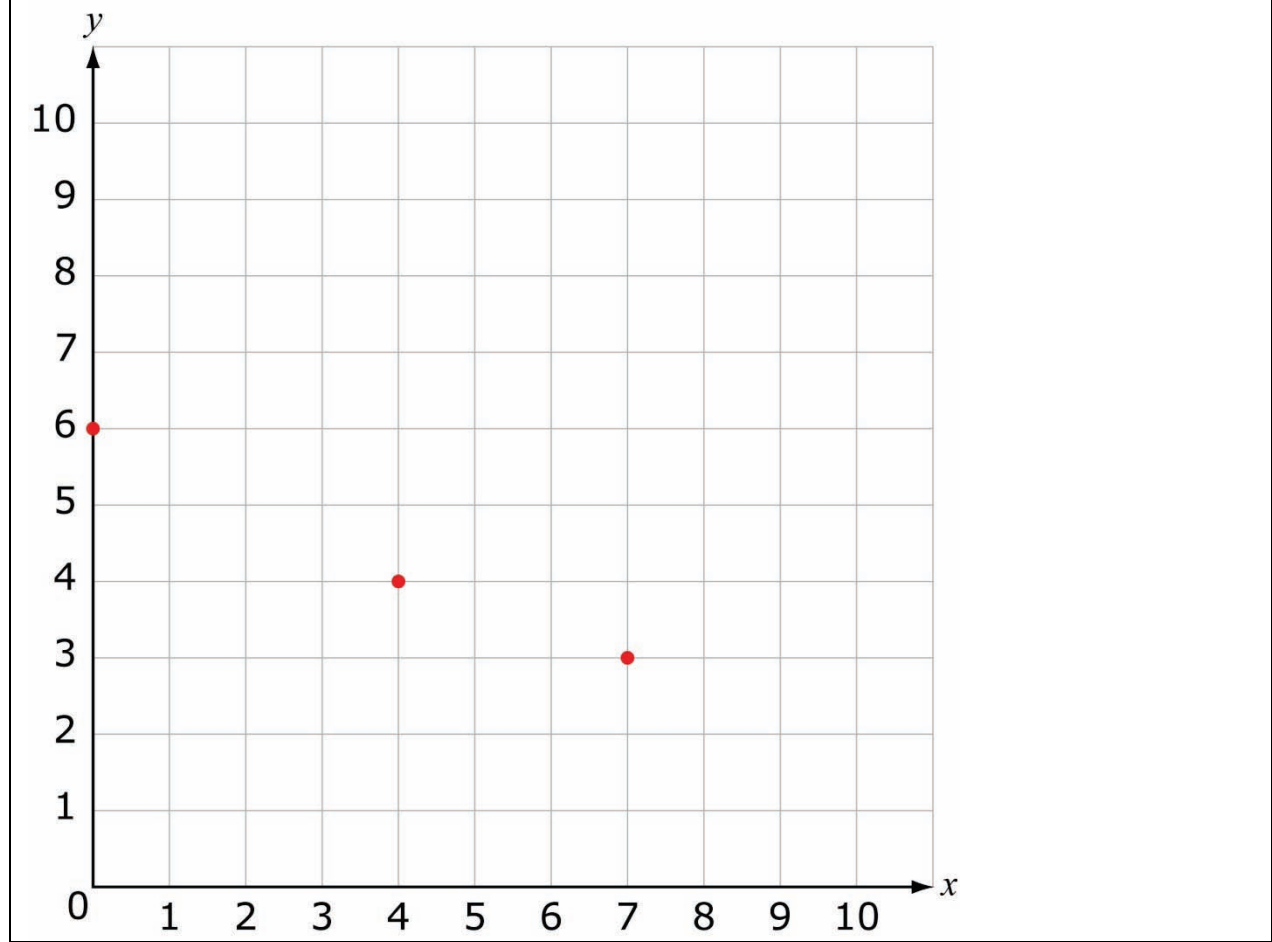
*TE Information:*

**Item Code:** MAT.05.TE.1.0000G.J.252

**Template: Placing Points**

**Interaction Space Parameters:**
>   A: False
>   B: (0, 0); (10, 10); one unit; axes are labeled with *x* and *y*
>   C: True
>   D: False
>   E:
>   F: True
>   G: Three

**Scoring Data:** SumOnly
>   For all coordinates, tolerance = 0, correct score-points = 1/3, and incorrect score-
>>   points = 0
>   (4,4)
>   (7,3)
>   (0,6)

# MAT.05.TE.1.0000G.K.260 C1 TK

| | |
|---|---|
| Sample Item ID: | MAT.05.TE.1.0000G.K.260 |
| Grade: | 05 |
| Claim(s): | **Claim 1: Concepts and Procedures**<br>Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Assessment Target(s): | 1 K: Classify two-dimensional figures into categories based on their properties. |
| Content Domain: | Geometry |
| Standard(s): | 5.G.3 |
| Mathematical Practice(s): | 1, 6, 7, 8 |
| DOK: | 2 |
| Item Type: | TE |
| Score Points: | 2 |
| Difficulty: | M |
| Key: | See Sample Top-Score Response. |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., accessibility issues): | |
| Notes: | TE template: Classification |

Classify the triangles as scalene, right, and/or acute. If a triangle fits more than one classification, place it in all the boxes that apply. If none of these classifications apply, leave it outside the boxes.
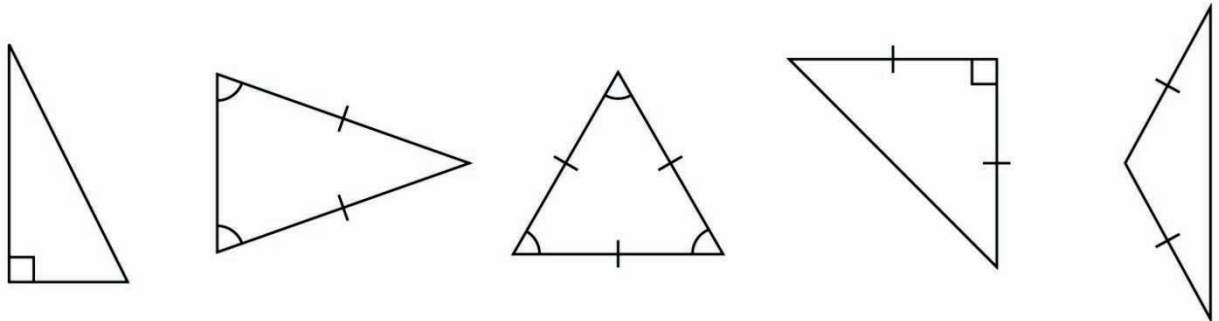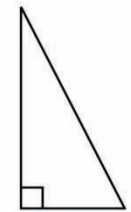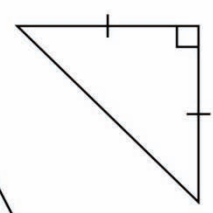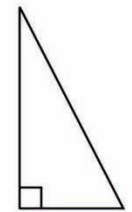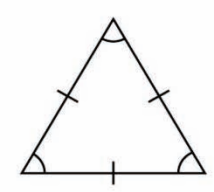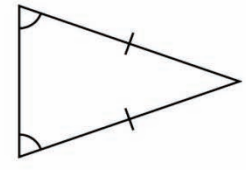


Click on a shape and then click inside a box to place a shape in the box.

| Scalene | Right | Acute |
|---------|-------|-------|
|         |       |       |

*Sample Top-Score Response:*

| Scalene | Right | Acute |
|---------|-------|-------|


*Scoring Rubric:*

*Responses to this item will receive 0-2 points, based on the following:*

**2 points:** The student demonstrates thorough understanding of the classification of two-dimensional shapes into categories based on their properties. The student shows understanding that some shapes should be classified in more than one box, as they have more than one of the characteristics. Additionally, the student shows understanding that some shapes should not be classified, as they have none of the given characteristics.

**1 point:** The student demonstrates partial understanding of the classification of two-dimensional shapes into categories based on their properties. The student makes a single error by not placing the right scalene triangle into both boxes. All other classifications are correct.

**0 points:** The student demonstrates inconsistent or no understanding of the classification of two-dimensional shapes into categories based on their properties. If a shape is placed in a box that doesn't match any of its characteristics, then no points are earned.

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*TE Information:*

**Item Code:** MAT.05.TE.1.0000G.K.260

**Template:** Classification

**Interaction Space Parameters:**
   A.  The 3 columns in the table: Scalene, Right, Acute
   B.  The following 5 triangles: right scalene, acute, acute, right, isosceles

**Scoring Data:**

   {1=A,2=AD,3=BC}=1

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## MAT.05.TE.1.000NF.F.251 C1 TF

| | |
|---|---|
| Sample Item ID: | MAT.05.TE.1.000NF.F.251 |
| Grade: | 05 |
| Claim(s): | **Claim 1: Concepts and Procedures**<br>Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Assessment Target(s): | 1 F: Apply and extend previous understandings of multiplication and division to multiply and divide fractions. |
| Content Domain: | Number and Operations – Fractions |
| Standard(s): | 5.NF.5 |
| Mathematical Practice(s): | 1, 6, 7 |
| DOK: | 1 |
| Item Type: | TE |
| Score Points: | 1 |
| Difficulty: | M |
| Key: | See Sample Top-Score Response. |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., accessibility issues): | |
| Notes: | TE template: Classification |

Classify each product below as less than $\frac{5}{8}$, equal to $\frac{5}{8}$, or greater than $\frac{5}{8}$ by moving each expression to the correct box.

| | | | | | |
|---|---|---|---|---|---|
| $\frac{5}{8} \times \frac{1}{4}$ | $\frac{5}{8} \times \frac{13}{6}$ | $\frac{5}{8} \times 1\frac{1}{16}$ | $\frac{5}{8} \times \frac{7}{8}$ | $\frac{5}{8} \times \frac{6}{6}$ | $\frac{5}{8} \times 3$ |

| Less Than $\frac{5}{8}$ | Equal to $\frac{5}{8}$ | Greater Than $\frac{5}{8}$ |
|---|---|---|
| | | |

*Sample Top-Score Response:*

| Less than $\frac{5}{8}$ | Equal to $\frac{5}{8}$ | Greater than $\frac{5}{8}$ |
|---|---|---|
| $\frac{5}{8} \times \frac{1}{4}$ <br><br> $\frac{5}{8} \times \frac{7}{8}$ | $\frac{5}{8} \times \frac{6}{6}$ | $\frac{5}{8} \times \frac{13}{6}$ <br><br> $\frac{5}{8} \times 1\frac{1}{16}$ <br><br> $\frac{5}{8} \times 3$ |

*TE Information:*

**Item Code:** MAT.04.TE.1.0000G.L.251

**Template: Classification**

**Interaction Space Parameters:**

    A.  The 3 columns in the table: less than $\frac{5}{8}$, equal to $\frac{5}{8}$, greater than $\frac{5}{8}$.

    B.  The following 6 products: $\frac{5}{8} \times \frac{1}{4}$, $\frac{5}{8} \times \frac{13}{6}$, $\frac{5}{8} \times 1\frac{1}{16}$, $\frac{5}{8} \times \frac{7}{8}$, $\frac{5}{8} \times \frac{6}{6}$, $\frac{5}{8} \times 3$.

**Scoring Data:**

    {1=AD,2=E,3=BCF}=1

## MAT.05.TE.2.000NF.A.003 Claim 2

| | |
|---|---|
| Sample Item ID: | MAT.05.TE.2.000NF.A.003 |
| Grade: | 05 |
| Primary Claim: | **Claim 2: Problem Solving**<br>Students can solve a range of well-posed problems in pure and applied mathematics, making productive use of knowledge and problem-solving strategies. |
| Secondary Claim(s): | Claim 1: Concepts and Procedures<br>Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. |
| Primary Content Domain: | Numbers and Operations—Fractions |
| Secondary Content Domain(s): | |
| Assessment Target(s): | 2 A: Apply mathematics to solve well-posed problems in everyday life, society, and the workplace.<br><br>1 F: Apply and extend previous understandings of multiplication and division to multiply and divide fractions. |
| Standard(s): | 5.NF.4, 5.NF.6 |
| Mathematical Practice(s): | 1, 2, 4, 5 |
| DOK: | 2 |
| Item Type: | TE |
| Score Points: | 2 |
| Difficulty: | M |
| Key: | See Sample Top-Score Response. |
| Stimulus/Source: | |
| Target-Specific Attributes (e.g., accessibility issues): | |
| Notes: | Requires both TE tiling and AI scoring. |

Gregory is installing tile on a rectangular floor.

- He is using square tiles.

- The length of a side of each tile is $\frac{1}{2}$ foot.

- The area of the floor is 22 square feet.
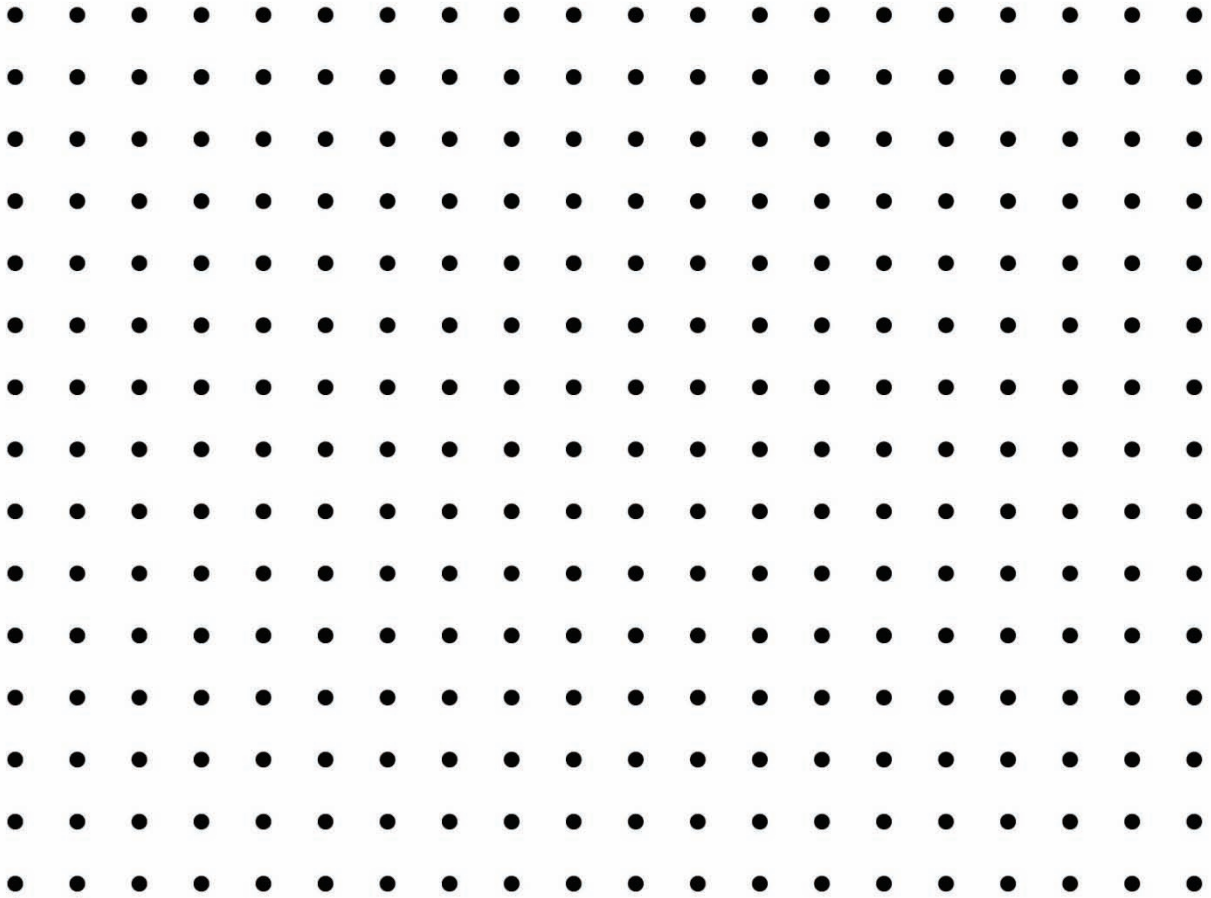
- The width of the floor is 4 feet.


Use the grid to model the rectangular floor that Gregory is installing.

Click on the square tile and then click anywhere in the grid to place a copy of the tile on the grid. Continue as many times as necessary.
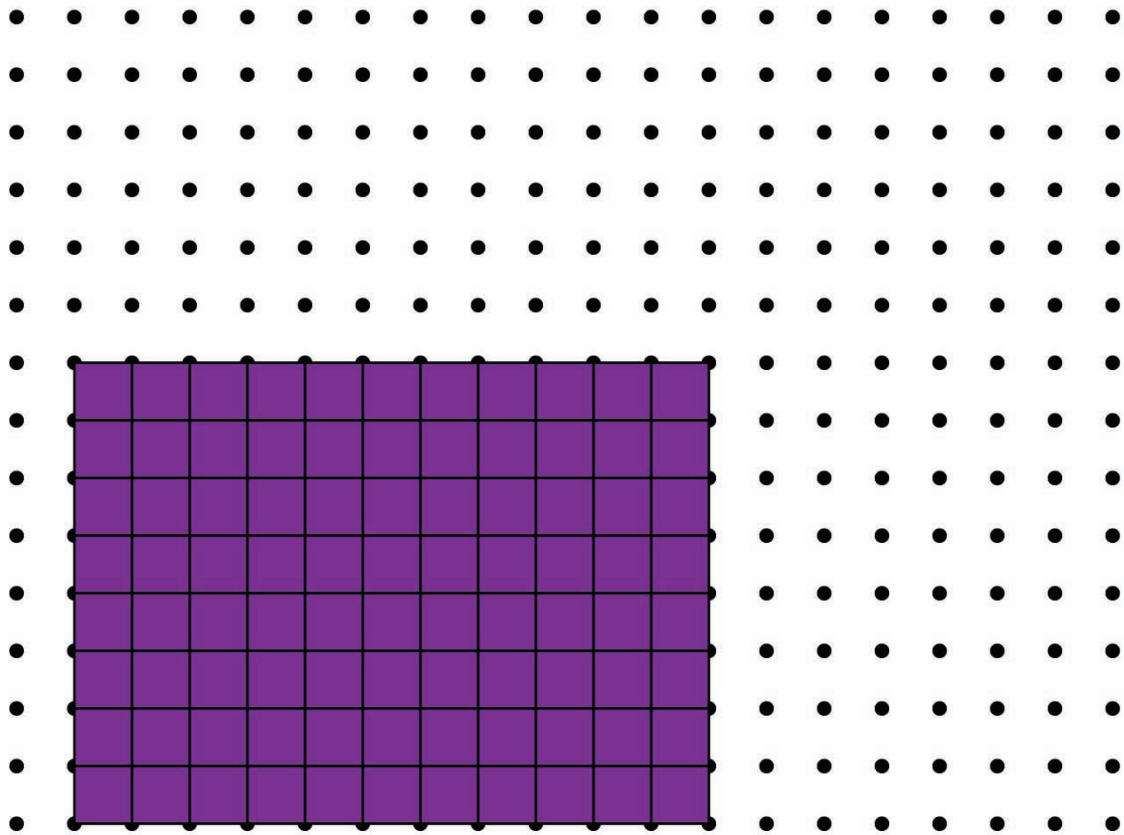
Click on a tile in the grid and then click on the trash can to remove extra tiles.

$\frac{1}{2}$ foot

What is the **length**, in feet, of the floor?

*Sample Top-Score Response:*



$\frac{1}{2}$ foot

What is the length, in feet, of the floor?

$5\frac{1}{2}$ or 5.5

*Scoring Rubric:*

*Responses to this item will receive 0-2 points, based on the following:*

**2 points:** Student thoroughly understands the relationship between area and its dimensions. Can model a rectangular floor that has an area of 22 square feet and identify the length of the floor as 5 ½ feet.

**1 point:** Student understands how length and width relate to area and can create a rectangular floor of 22 square feet, but incorrectly identifies the length of the floor. **OR** The student can determine the length of the floor by dividing 22 by 4, but cannot model the rectangular floor with the tiles.

**0 points:** Student shows little or no understanding of how length and width related to area of a rectangular floor when one dimension of the floor has a fractional value.