# Alabama Comprehensive Assessment Program (ACAP)

# Summative

# Item Specifications

## Mathematics

## Grade 7

# Alabama Item Specifications
# Grade 7 Mathematics
# *Alabama Comprehensive Assessment Program* (ACAP)
# *Summative*

The *Alabama Comprehensive Assessment Program* (ACAP) *Summative* item specifications are based on the development of summative assessments that measure the Alabama Course of Study Standards. The item specifications define the purpose of the *ACAP Summative* and provide important information regarding the content to be measured. The item specifications also serve as a road map to guide Alabama educators in the development and subsequent review of items that best measure the Course of Study Standards for a given grade and subject area. Each item specification is aligned to the given Alabama content area, cluster, and standard and includes the following key information:

- Evidence statements
- Content limits/constraints
- Recommended Webb's Depth of Knowledge (DOK) or cognitive levels
- Calculator usage
- Item types for measuring a given standard
- Information regarding whether or not context is allowable
- Sample item stem information

The appendix to this document includes sample test items, along with information about the item, including item type, page reference, alignment, depth of knowledge, and answer key. These sample items are provided to be an additional resource for educators to help guide instruction and assessment-building in the classroom. Teachers can use the sample items as models when leading classroom discussion as well as creating items for classroom tests or quizzes. In each sample item, the level of rigor needed in the item in order to align with the content standard is evident.

## Definitions

**Course of Study Standards:** The Course of Study Standards are a set of content curriculum statements that define what students should know and be able to do at a given grade level. The goal is to prepare students for future opportunities and options in the workplace and for everyday life. Through the implementation of the Alabama Course of Study for Mathematics, students will be well equipped for the workforce upon graduation or ready to pursue higher levels of education in Alabama's colleges and universities.

**Alabama Content Areas:** Alabama content areas are large groups of related clusters and content standards. Because mathematics is a connected subject, standards from different Alabama content areas may sometimes be closely related.

**Clusters:** Clusters are groups of related content standards. Because mathematics is a connected subject, standards from different clusters may sometimes be closely related.

**Standards:** Standards define what students should understand (know) and be able to do at the conclusion of a course or grade. The standard text in the item specification is preceded by a standard identifier (e.g., 4.OA.1) to indicate the student grade level as fourth (4), the Alabama content area as Operations and Algebraic Thinking (OA), and the standard number as one (1).

**Evidence Statements:** Evidence statements are closely aligned to the standard and do not deviate from the requirements of the standard. Standards that are substantial in content do provide for a better opportunity to "unpack the standard," which is the case for many of the Alabama Course of Study Standards. The evidence statements serve that purpose.

**Assessment Limits/Content Constraints:** Assessment limits and/or content constraints define the range of content knowledge and the degree of difficulty allowable when items are written to measure a given standard.

**Depth of Knowledge (DOK):** Depth of knowledge involves the cognitive complexity or the nature of thinking required for a given item. Most recently, Webb's Depth of Knowledge levels are used in the development of items for cognitive demand. Therefore, when developing items for depth of knowledge, the item should be as demanding cognitively as what the actual standard expects. Webb's Depth of Knowledge includes four levels, from the lowest (basic recall) to the highest (extended thinking). The mathematics *ACAP Summative* assessment items are written to one of three cognitive levels of complexity:

- Level 1: Recall
- Level 2: Application of a Skill/Concept
- Level 3: Strategic Thinking

**Item Types:** The *ACAP Summative* assessments are composed of various item types. These item types are described in the following section.

**Context:** Context provides information regarding the types of stimulus materials that can be used in the items. If a context is allowable, it means that the item may have context. If context is required, then the item measuring the given standard must have context. If no context is noted, then the items measuring the given standard should not have context.

**Sample Stem Information:** This statement explains what students are expected to do when they respond to a given item.

## Item Types

The *Alabama Comprehensive Assessment Program* (ACAP) *Summative* assessments are composed of various item types. These item types are described below.

**Multiple-Choice (MC) Items:** MC items have four answer choices, including three distractors and one correct answer. Distractors for mathematics represent common misconceptions, incorrect logic, incorrect application of an algorithm, computational errors, etc. A correct response to an MC item is worth one score point in the mathematics *ACAP Summative*.

**Multiple-Select (MS) Items:** MS items are similar in structure to MC items. However, unlike an MC item, an MS item has more than four options and more than one correct answer. In other words, multiple responses are required for a given item. For mathematics, there are two types of MS configurations. One has five answer options, two of which are correct, and the other has six answer options, two or three of which are correct. Directions for the number of options to select are provided with each item. A correct response to an MS item is worth one score point in the mathematics *ACAP Summative*.

**Short-Answer (SA) Items:** SA items are constructed-response items that require a keyed response from the student. The number of characters is limited to a relatively small number in order to facilitate autoscoring. The types of characters allowed can also be limited to text only, numbers only, or a mix. In the mathematics *ACAP Summative*, this item type is autoscored using scoring guidelines for the correct answer. A correct response to an SA item is worth one score point in the mathematics *ACAP Summative*.

**Technology-Enhanced (TE) Items:** TE items share the same functional structure as traditional paper-and-pencil test items; however, the expansive features and functions of a computer-based medium allow for the incorporation of technical enhancements into traditional elements of a test item, such as the stem, the stimulus (if any), the response area, or a combination of all three. These items require the use of one or more tools. A correct response to a TE item is worth one score point in the mathematics *ACAP Summative*. Mathematics TE items include, but are not limited to, the following:

- **Angle Draw Input:** These TE items provide a student with a given ray, and then the student completes the angle by drawing a second ray.
- **Drag-and-Drop Input**: These TE items provide a student with draggable entities that can be configured to be used once or multiple times.
- **Drop-Down List Input:** These TE items allow a student to select elements in drop-down lists that can be embedded within text or tables.
- **Hot Spot:** These TE items allow for an image to be highlighted or replaced with another image when selected by the student.
- **Line Plot Input:** These TE items provide another way for a student to graphically represent data when the structure is provided. Certain labeling on the line plot can be done by the student.
- **Matching:** These TE items allow for the use of text or graphics as the matching objects. The student selects one object and then selects a second object to connect them.
- **Matching Table:** These TE items include a table with multiple rows and columns, and the student makes matches between the given elements in the rows and columns. The table can be customized to allow for only a single selection in a row or column or for multiple selections within each.
- **Number Line Input:** These TE items allow a student to create a number line graph that might involve plotting points only or points and lines. Both closed and open points are available, as well as line segments and rays.

## Standards for Mathematical Practice

The Standards for Mathematical Practice are based on important "processes and proficiencies" that have longstanding importance in mathematics education. The first of these are the National Council of Teachers of Mathematics (NCTM) process standards of problem-solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council's report *Adding It Up: Helping Children Learn Mathematics*. These proficiencies include adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations, and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently, and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy). Because these practices are an important part of the curriculum, they will be assessed throughout the mathematics *ACAP Summative*. The eight Standards for Mathematical Practice are listed below, but more detail is provided in the Alabama Course of Study for Mathematics.

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

## Mathematics Reference Sheets

An online reference sheet is available as a pop-up window in certain grades.

| Grade | Conversions | Formulas |
|---|---|---|
| 2 | No | No |
| 3 | No | No |
| 4 | Yes | Yes |
| 5 | Yes | Yes |
| 6 | Yes | Yes |
| 7 | Yes | Yes |
| 8 | Yes | Yes |

## Item Specifications for Mathematics

Item specifications are one of the key requirements for a high-quality, legally defensible, standards-based assessment. Item specifications help define important characteristics of the items (i.e., test questions) developed for each standard. These item specifications provide guidelines to help clarify the focus of what is to be assessed, what items may include, and what items may not include (i.e., assessment limits). Item specifications are used by item writers, item editors, and item reviewers as a common reference throughout the item-development process, from initial writing to final approval. These item specifications are based on the 2019 Alabama Course of Study Standards for Mathematics.

| | |
|---|---|
| **Content Area** | PR: Proportional Reasoning |
| **Cluster** | Analyze proportional relationships and use them to solve real-world and mathematical problems. |
| **Standard (2019 AL COS)** | 7.PR.1: Calculate unit rates of length, area, and other quantities measured in like or different units that include ratios or fractions. |
| Evidence Statements | The student will calculate unit rates of length, area, and other quantities measured in like or different units that include ratios or fractions. |
| Assessment Limits / Content Constraints | Tasks have a real-world context.<br><br>Tasks do not assess unit conversions. |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a context-based rate as a fraction to a fraction, compute the unit rate. |

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|---|---|
| **Content Area** | PR: Proportional Reasoning |
| **Cluster** | Analyze proportional relationships and use them to solve real-world and mathematical problems. |
| **Standard (2019 AL COS)** | 7.PR.2a: Represent a relationship between two quantities and determine whether the two quantities are related proportionally.<br>a. Use equivalent ratios displayed in a table or in a graph of the relationship in the coordinate plane to determine whether a relationship between two quantities is proportional. |
| Evidence Statements | The student will use equivalent ratios displayed in a table or in a graph of the relationship in the coordinate plane to determine whether a relationship between two quantities is proportional. |
| Assessment Limits / Content Constraints | Tasks have “thin context” or no context.<br><br>Tasks are not limited to ratios of whole numbers.<br><br>Tasks use only coordinates in Quadrant 1 and use only a positive constant of proportionality. |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a set of tables or graphs, identify the table or graph that shows a proportional relationship.<br><br>Given an incomplete table, fill in missing values in a proportional relationship. |

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|---|---|
| **Content Area** | PR: Proportional Reasoning |
| **Cluster** | Analyze proportional relationships and use them to solve real-world and mathematical problems. |
| **Standard (2019 AL COS)** | 7.PR.2b: Represent a relationship between two quantities and determine whether the two quantities are related proportionally.<br>b. Identify the constant of proportionality (unit rate) and express the proportional relationship using multiple representations including tables, graphs, equations, diagrams, and verbal descriptions. |
| Evidence Statements | The student will identify the constant of proportionality (unit rate) and express the proportional relationship using multiple representations including tables, graphs, equations, diagrams, and verbal descriptions. |
| Assessment Limits / Content Constraints | Tasks may or may not have a context.<br><br>Tasks use only coordinates in Quadrant 1 and use only a positive constant of proportionality. |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a table, graph, equation, or verbal description of a proportional relationship, identify the constant of proportionality.<br><br>Given a context, represent a proportional relationship in two variables. |

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|---|---|
| **Content Area** | PR: Proportional Reasoning |
| **Cluster** | Analyze proportional relationships and use them to solve real-world and mathematical problems. |
| **Standard (2019 AL COS)** | 7.PR.2c: Represent a relationship between two quantities and determine whether the two quantities are related proportionally.<br>c. Explain in context the meaning of a point (*x*,*y*) on the graph of a proportional relationship, with special attention to the points (0,0) and (1, *r*) where *r* is the unit rate. |
| Evidence Statements | The student will explain in context the meaning of a point (*x*,*y*) on the graph of a proportional relationship, with special attention to the points (0,0) and (1, *r*) where *r* is the unit rate. |
| Assessment Limits / Content Constraints | Tasks require students to interpret a point (*x*, *y*) on the graph of a proportional relationship in terms of the situation.<br><br>Tasks use only coordinates in Quadrant 1 and use only a positive constant of proportionality. |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a context and a graph of a proportional relationship, interpret a point on the graph in terms of a proportional relationship. |

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|---|---|
| **Content Area** | PR: Proportional Reasoning |
| **Cluster** | Analyze proportional relationships and use them to solve real-world and mathematical problems. |
| **Standard (2019 AL COS)** | 7.PR.3: Solve multi-step percent problems in context using proportional reasoning, including simple interest, tax, gratuities, commissions, fees, markups and markdowns, percent increase, and percent decrease. |
| Evidence Statements | The student will solve multi-step percent problems in context using proportional reasoning, including simple interest, tax, gratuities, commissions, fees, markups and markdowns, percent increase, and percent decrease. |
| Assessment Limits / Content Constraints | Tasks include proportional relationships that involve only positive numbers. |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Solve a multi-step ratio or percent problem. |

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|---|---|
| **Content Area** | NSO: Number Systems and Operations |
| **Cluster** | Apply and extend prior knowledge of addition, subtraction, multiplication, and division to operations with rational numbers. |
| **Standard (2019 AL COS)** | 7.NSO.4a: Apply and extend knowledge of operations of whole numbers, fractions, and decimals to add, subtract, multiply, and divide rational numbers including integers, signed fractions, and decimals.<br>a. Identify and explain situations where the sum of opposite quantities is 0 and opposite quantities are defined as additive inverses. |
| Evidence Statements | The student will identify and explain situations where the sum of opposite quantities is 0 and opposite quantities are defined as additive inverses. |
| Assessment Limits / Content Constraints | |
| DOK(s) | 1, 2, or 3 |
| Calculator | NO – a calculator will not be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a number, identify the additive inverse. |

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|---|---|
| **Content Area** | NSO: Number Systems and Operations |
| **Cluster** | Apply and extend prior knowledge of addition, subtraction, multiplication, and division to operations with rational numbers. |
| **Standard (2019 AL COS)** | 7.NSO.4b: Apply and extend knowledge of operations of whole numbers, fractions, and decimals to add, subtract, multiply, and divide rational numbers including integers, signed fractions, and decimals.<br>b. Interpret the sum of two or more rational numbers, by using a number line and in real-world contexts. |
| Evidence Statements | The student will interpret the sum of two or more rational numbers, by using a number line and in real-world contexts. |
| Assessment Limits / Content Constraints | Tasks are not limited to integers.<br><br>Tasks may require students to produce or recognize real-world contexts that correspond to given sums of rational numbers. |
| DOK(s) | 1, 2, or 3 |
| Calculator | NO – a calculator will not be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given an addition expression with rational numbers, describe what the model would look like on a number line. |

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|---|---|
| **Content Area** | NSO: Number Systems and Operations |
| **Cluster** | Apply and extend prior knowledge of addition, subtraction, multiplication, and division to operations with rational numbers. |
| **Standard (2019 AL COS)** | 7.NSO.4c: Apply and extend knowledge of operations of whole numbers, fractions, and decimals to add, subtract, multiply, and divide rational numbers including integers, signed fractions, and decimals.<br>c. Explain subtraction of rational numbers as addition of additive inverses. |
| Evidence Statements | The student will explain subtraction of rational numbers as addition of additive inverses. |
| Assessment Limits / Content Constraints | Tasks may or may not have a context.<br><br>Tasks are not limited to integers.<br><br>Contextual tasks may require students to create or identify a situation described by a specific equation of the general form $p - q = p + (-q)$.<br><br>Non-contextual tasks are not computation tasks but rather require students to demonstrate conceptual understanding by identifying a difference that is equivalent to a given difference. |
| DOK(s) | 1, 2, or 3 |
| Calculator | NO – a calculator will not be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | |

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|---|---|
| **Content Area** | NSO: Number Systems and Operations |
| **Cluster** | Apply and extend prior knowledge of addition, subtraction, multiplication, and division to operations with rational numbers. |
| **Standard (2019 AL COS)** | 7.NSO.4d: Apply and extend knowledge of operations of whole numbers, fractions, and decimals to add, subtract, multiply, and divide rational numbers including integers, signed fractions, and decimals.<br>d. Use a number line to demonstrate that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. |
| Evidence Statements | The student will use a number line to demonstrate that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. |
| Assessment Limits / Content Constraints | Tasks may or may not have a context.<br><br>Tasks are not limited to integers.<br><br>Contextual tasks may require students to create or identify a situation described by a specific equation of the general form $p - q = p + (-q)$.<br><br>Non-contextual tasks are not computation tasks but rather require students to demonstrate conceptual understanding by identifying a difference that is equivalent to a given difference. |
| DOK(s) | 1, 2, or 3 |
| Calculator | NO – a calculator will not be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given two points on a number line, identify the distance between the two points.<br><br>Given a context with a positive number and a negative number, identify a statement of the distance between the two numbers in context. |

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|---|---|
| **Content Area** | NSO: Number Systems and Operations |
| **Cluster** | Apply and extend prior knowledge of addition, subtraction, multiplication, and division to operations with rational numbers. |
| **Standard (2019 AL COS)** | 7.NSO.4e: Apply and extend knowledge of operations of whole numbers, fractions, and decimals to add, subtract, multiply, and divide rational numbers including integers, signed fractions, and decimals.<br>e. Extend strategies of multiplication to rational numbers to develop rules for multiplying signed numbers, showing that the properties of the operations are preserved. |
| Evidence Statements | The student will extend strategies of multiplication to rational numbers to develop rules for multiplying signed numbers, showing that the properties of the operations are preserved. |
| Assessment Limits / Content Constraints | Tasks require students to demonstrate conceptual understanding (e.g., by providing students with a numerical expression and requiring students to produce or recognize an equivalent expression). |
| DOK(s) | 1, 2, or 3 |
| Calculator | NO – a calculator will not be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a context, create an expression with multiplication of rational numbers that models that context.<br><br>Given a context, solve a problem involving multiplication of rational numbers. |

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| **Content Area** | NSO: Number Systems and Operations |
| **Cluster** | Apply and extend prior knowledge of addition, subtraction, multiplication, and division to operations with rational numbers. |
| **Standard (2019 AL COS)** | 7.NSO.4f: Apply and extend knowledge of operations of whole numbers, fractions, and decimals to add, subtract, multiply, and divide rational numbers including integers, signed fractions, and decimals.<br>f. Divide integers and explain that division by zero is undefined. Interpret the quotient of integers (with a non-zero divisor) as a rational number. |
| Evidence Statements | The student will divide integers and explain that division by zero is undefined.<br><br>The student will interpret the quotient of integers (with a non-zero divisor) as a rational number. |
| Assessment Limits / Content Constraints | Tasks require students to demonstrate conceptual understanding (e.g., by producing or recognizing an equivalent expression). |
| DOK(s) | 1, 2, or 3 |
| Calculator | NO – a calculator will not be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a fraction in the form $-(p/q)$, $(-p)/q$, or $p/(-q)$, identify an equivalent fraction in another form.<br><br>Evaluate an expression involving the division of rational numbers.<br><br>Interpret a quotient of rational numbers in terms of a context. |

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| **Content Area** | NSO: Number Systems and Operations |
| **Cluster** | Apply and extend prior knowledge of addition, subtraction, multiplication, and division to operations with rational numbers. |
| **Standard (2019 AL COS)** | 7.NSO.4g: Apply and extend knowledge of operations of whole numbers, fractions, and decimals to add, subtract, multiply, and divide rational numbers including integers, signed fractions, and decimals.<br>g. Convert a rational number to a decimal using long division, explaining that the decimal form of a rational number terminates or eventually repeats. |
| Evidence Statements | The student will convert a rational number to a decimal using long division, explaining that the decimal form of a rational number terminates or eventually repeats. |
| Assessment Limits / Content Constraints | |
| DOK(s) | 1, 2, or 3 |
| Calculator | NO – a calculator will not be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a rational number in fraction form, write the number as a terminating or repeating decimal. |

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|---|---|
| **Content Area** | NSO: Number Systems and Operations |
| **Cluster** | Apply and extend prior knowledge of addition, subtraction, multiplication, and division to operations with rational numbers. |
| **Standard (2019 AL COS)** | 7.NSO.5: Solve real-world and mathematical problems involving the four operations of rational numbers, including complex fractions. Apply properties of operations as strategies where applicable. |
| Evidence Statements | The student will solve real-world and mathematical problems involving the four operations of rational numbers, including complex fractions. Apply properties of operations as strategies where applicable. |
| Assessment Limits / Content Constraints | Tasks involve at least one negative number.<br><br>Tasks are not limited to integers. |
| DOK(s) | 1, 2, or 3 |
| Calculator | NO – a calculator will not be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Solve problems involving the four operations with rational numbers. |

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|---|---|
| **Content Area** | AF: Algebra and Functions |
| **Cluster** | Create equivalent expressions using the properties of operations. |
| **Standard (2019 AL COS)** | 7.AF.6: Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. |
| Evidence Statements | The student will apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. |
| Assessment Limits / Content Constraints | Tasks are not limited to integer coefficients.<br><br>Tasks may involve issues of strategy (e.g., by providing a factored expression, such as $y(3 + x + k)$, and a fully expanded expression, such as $3y + xy + ky$, and requiring students to produce or identify a new expression equivalent to both, such as $y(3 + x) + yk$). |
| DOK(s) | 1, 2, or 3 |
| Calculator | NO – a calculator will not be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a linear expression, identify an equivalent linear expression. |

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|---|---|
| **Content Area** | AF: Algebra and Functions |
| **Cluster** | Create equivalent expressions using the properties of operations. |
| **Standard (2019 AL COS)** | 7.AF.7: Generate expressions in equivalent forms based on context and explain how the quantities are related. |
| Evidence Statements | The student will generate expressions in equivalent forms based on context and explain how the quantities are related. |
| Assessment Limits / Content Constraints | |
| DOK(s) | 1, 2, or 3 |
| Calculator | NO – a calculator will not be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a context-based problem and an expression that represents that context, identify an equivalent expression that shows some aspects of that context. |

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|---|---|
| **Content Area** | AF: Algebra and Functions |
| **Cluster** | Solve real-world and mathematical problems using numerical and algebraic expressions, equations, and inequalities. |
| **Standard (2019 AL COS)** | 7.AF.8: Solve multi-step real-world and mathematical problems involving rational numbers (integers, signed fractions and decimals), converting between forms as needed. Assess the reasonableness of answers using mental computation and estimation strategies. |
| Evidence Statements | The student will solve multi-step real-world and mathematical problems involving rational numbers (integers, signed fractions and decimals), converting between forms as needed.<br><br>The student will assess the reasonableness of answers using mental computation and estimation strategies. |
| Assessment Limits / Content Constraints | |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a context-based problem with rational numbers, identify an appropriate approximation. |

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|---|---|
| **Content Area** | AF: Algebra and Functions |
| **Cluster** | Solve real-world and mathematical problems using numerical and algebraic expressions, equations, and inequalities. |
| **Standard (2019 AL COS)** | 7.AF.9a: Use variables to represent quantities in real-world or mathematical problems and construct algebraic expressions, equations, and inequalities to solve problems by reasoning about the quantities.<br>a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where $p$, $q$, and $r$ are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. |
| Evidence Statements | The student will solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where $p$, $q$, and $r$ are specific rational numbers, and will solve equations of these forms fluently.<br><br>The student will compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. |
| Assessment Limits / Content Constraints | Tasks may require students to solve two equations (one of each of the two given forms). |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a context-based problem and an equation in the form $px + q = r$ or $p(x + q) = r$, solve the problem and/or equation. |

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|---|---|
| **Content Area** | AF: Algebra and Functions |
| **Cluster** | Solve real-world and mathematical problems using numerical and algebraic expressions, equations, and inequalities. |
| **Standard (2019 AL COS)** | 7.AF.9b: Use variables to represent quantities in real-world or mathematical problems and construct algebraic expressions, equations, and inequalities to solve problems by reasoning about the quantities.<br>b. Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where $p$, $q$, and $r$ are specific rational numbers. Graph the solution set of the inequality, and interpret it in the context of the problem. |
| Evidence Statements | The student will solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where $p$, $q$, and $r$ are specific rational numbers. Graph the solution set of the inequality, and interpret it in the context of the problem. |
| Assessment Limits / Content Constraints | Tasks may involve <, >, ≤, or ≥. |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Solve a context-based problem that can be represented by an inequality in the form $px + q > r$ or $px + q < r$.<br><br>Given a context-based problem and an inequality in the form $px + q > r$ or $px + q < r$, evaluate the inequality by substitution. |

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|---|---|
| **Content Area** | DSP: Data Analysis, Statistics, and Probability |
| **Cluster** | Make inferences about a population using random sampling. |
| **Standard (2019 AL COS)** | 7.DSP.10a: Examine a sample of a population to generalize information about the population.<br>a. Differentiate between a sample and a population. |
| Evidence Statements | The student will differentiate between a sample and a population. |
| Assessment Limits / Content Constraints | |
| DOK(s) | 1, 2, or 3 |
| Calculator | NEUTRAL – a calculator may or may not be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a population, identify a sample of the population. |

| | |
|---|---|
| **Content Area** | DSP: Data Analysis, Statistics, and Probability |
| **Cluster** | Make inferences about a population using random sampling. |
| **Standard (2019 AL COS)** | 7.DSP.10b: Examine a sample of a population to generalize information about the population.<br>b. Compare sampling techniques to determine whether a sample is random and thus representative of a population, explaining that random sampling tends to produce representative samples and support valid inferences. |
| Evidence Statements | The student will compare sampling techniques to determine whether a sample is random and thus representative of a population, explaining that random sampling tends to produce representative samples and support valid inferences. |
| Assessment Limits / Content Constraints | |
| DOK(s) | 1, 2, or 3 |
| Calculator | NEUTRAL – a calculator may or may not be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a set of samples, identify a random sample. |

| | |
|---|---|
| **Content Area** | DSP: Data Analysis, Statistics, and Probability |
| **Cluster** | Make inferences about a population using random sampling. |
| **Standard (2019 AL COS)** | 7.DSP.10c: Examine a sample of a population to generalize information about the population.<br>c. Determine whether conclusions and generalizations can be made about a population based on a sample. |
| Evidence Statements | The student will determine whether conclusions and generalizations can be made about a population based on a sample. |
| Assessment Limits / Content Constraints | |
| DOK(s) | 1, 2, or 3 |
| Calculator | NEUTRAL – a calculator may or may not be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a set of samples, identify the sample that best models the population. |

| | |
|---|---|
| **Content Area** | DSP: Data Analysis, Statistics, and Probability |
| **Cluster** | Make inferences about a population using random sampling. |
| **Standard (2019 AL COS)** | 7.DSP.10d: Examine a sample of a population to generalize information about the population.<br>d. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest, generating multiple samples to gauge variation and making predictions or conclusions about the population. |
| Evidence Statements | The student will use data from a random sample to draw inferences about a population with an unknown characteristic of interest, generating multiple samples to gauge variation and making predictions or conclusions about the population. |
| Assessment Limits / Content Constraints | |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given two samples of the same size, create a comparison of the expected populations those samples represent.<br><br>Given a sample, establish reasonable criteria for estimates of the population. |

| | |
|---|---|
| **Content Area** | DSP: Data Analysis, Statistics, and Probability |
| **Cluster** | Make inferences about a population using random sampling. |
| **Standard (2019 AL COS)** | 7.DSP.10e: Examine a sample of a population to generalize information about the population.<br>e. Informally explain situations in which statistical bias may exist. |
| Evidence Statements | The student will informally explain situations in which statistical bias may exist. |
| Assessment Limits / Content Constraints | |
| DOK(s) | 1, 2, or 3 |
| Calculator | NEUTRAL – a calculator may or may not be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | |

| | |
|---|---|
| **Content Area** | DSP: Data Analysis, Statistics, and Probability |
| **Cluster** | Make inferences from an informal comparison of two populations. |
| **Standard (2019 AL COS)** | 7.DSP.11: Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. |
| Evidence Statements | The student will informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. |
| Assessment Limits / Content Constraints | Tasks may use mean absolute deviation, range, or interquartile range as a measure of variability. |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a graphical representation of two data sets with roughly equal variabilities, describe the difference between the medians by using the interquartile range. |

| | |
|---|---|
| **Content Area** | DSP: Data Analysis, Statistics, and Probability |
| **Cluster** | Make inferences from an informal comparison of two populations. |
| **Standard (2019 AL COS)** | 7.DSP.12: Make informal comparative inferences about two populations using measures of center and variability and/or mean absolute deviation in context. |
| Evidence Statements | The student will make informal comparative inferences about two populations using measures of center and variability and/or mean absolute deviation in context. |
| Assessment Limits / Content Constraints | |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given random samples of two data sets, draw inferences of what would be expected from the populations they represent. |

| | |
|---|---|
| **Content Area** | DSP: Data Analysis, Statistics, and Probability |
| **Cluster** | Investigate probability models. |
| **Standard (2019 AL COS)** | 7.DSP.13: Use a number from 0 to 1 to represent the probability of a chance event occurring, explaining that larger numbers indicate greater likelihood of the event occurring, while a number near zero indicates an unlikely event. |
| Evidence Statements | The student will use a number from 0 to 1 to represent the probability of a chance event occurring, explaining that larger numbers indicate greater likelihood of the event occurring, while a number near zero indicates an unlikely event. |
| Assessment Limits / Content Constraints | Tasks may involve probabilities that are certain (1) or impossible (0). |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a probability, match it to an appropriate likelihood statement.<br><br>Given a likelihood statement, match it to a probability. |

| | |
|---|---|
| **Content Area** | DSP: Data Analysis, Statistics, and Probability |
| **Cluster** | Investigate probability models. |
| **Standard (2019 AL COS)** | 7.DSP.14a: Define and develop a probability model, including models that may or may not be uniform, where uniform models assign equal probability to all outcomes and non-uniform models involve events that are not equally likely.<br>a. Collect and use data to predict probabilities of events. |
| Evidence Statements | The student will collect and use data to predict probabilities of events. |
| Assessment Limits / Content Constraints | |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a probability situation, determine the probability of given events. |

| | |
|---|---|
| **Content Area** | DSP: Data Analysis, Statistics, and Probability |
| **Cluster** | Investigate probability models. |
| **Standard (2019 AL COS)** | 7.DSP.14b: Define and develop a probability model, including models that may or may not be uniform, where uniform models assign equal probability to all outcomes and non-uniform models involve events that are not equally likely.<br>b. Compare probabilities from a model to observed frequencies, explaining possible sources of discrepancy. |
| Evidence Statements | The student will compare probabilities from a model to observed frequencies, explaining possible sources of discrepancy. |
| Assessment Limits / Content Constraints | |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given observed frequencies in a chance process, identify a probability model. |

| | |
|---|---|
| **Content Area** | DSP: Data Analysis, Statistics, and Probability |
| **Cluster** | Investigate probability models. |
| **Standard (2019 AL COS)** | 7.DSP.15a: Approximate the probability of an event using data generated by a simulation (experimental probability) and compare it to the theoretical probability.<br>a. Observe the relative frequency of an event over the long run, using simulation or technology, and use those results to predict approximate relative frequency. |
| Evidence Statements | The student will approximate the probability of an event using data generated by a simulation (experimental probability) and compare it to the theoretical probability.<br><br>The student will observe the relative frequency of an event over the long run, using simulation or technology, and use those results to predict approximate relative frequency. |
| Assessment Limits / Content Constraints | Tasks require the student to make a prediction based on long-run relative frequency in data from a chance process. |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a probability of an event, predict how many times the event will happen in a given number of trials. |

| | |
|---|---|
| **Content Area** | DSP: Data Analysis, Statistics, and Probability |
| **Cluster** | Investigate probability models. |
| **Standard (2019 AL COS)** | 7.DSP.16a: Find probabilities of simple and compound events through experimentation or simulation and by analyzing the sample space, representing the probabilities as percents, decimals, or fractions.<br>a. Represent sample spaces for compound events using methods such as organized lists, tables, and tree diagrams, and determine the probability of an event by finding the fraction of outcomes in the sample space for which the compound event occurred. |
| Evidence Statements | The student will represent sample spaces for compound events using methods such as organized lists, tables, and tree diagrams, and determine the probability of an event by finding the fraction of outcomes in the sample space for which the compound event occurred. |
| Assessment Limits / Content Constraints | |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given an organized list, table, tree diagram, or simulation, find the probability of a compound event. |

| | |
|---|---|
| **Content Area** | DSP: Data Analysis, Statistics, and Probability |
| **Cluster** | Investigate probability models. |
| **Standard (2019 AL COS)** | 7.DSP.16b: Find probabilities of simple and compound events through experimentation or simulation and by analyzing the sample space, representing the probabilities as percents, decimals, or fractions.<br>b. Design and use a simulation to generate frequencies for compound events. |
| Evidence Statements | The student will design and use a simulation to generate frequencies for compound events. |
| Assessment Limits / Content Constraints | |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a compound probability, identify a way to simulate that compound probability. |

| | |
|---|---|
| **Content Area** | DSP: Data Analysis, Statistics, and Probability |
| **Cluster** | Investigate probability models. |
| **Standard (2019 AL COS)** | 7.DSP.16c: Find probabilities of simple and compound events through experimentation or simulation and by analyzing the sample space, representing the probabilities as percents, decimals, or fractions.<br>c. Represent events described in everyday language in terms of outcomes in the sample space which composed the event. |
| Evidence Statements | The student will represent events described in everyday language in terms of outcomes in the sample space which composed the event. |
| Assessment Limits / Content Constraints | |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a compound event, describe the sample space for that event. |

| | |
|---|---|
| **Content Area** | GM: Geometry and Measurement |
| **Cluster** | Construct and describe geometric figures, analyzing relationships among them. |
| **Standard (2019 AL COS)** | 7.GM.17: Solve problems involving scale drawings of geometric figures, including computation of actual lengths and areas from a scale drawing and reproduction of a scale drawing at a different scale. |
| Evidence Statements | The student will solve problems involving scale drawings of geometric figures, including computation of actual lengths and areas from a scale drawing and reproduction of a scale drawing at a different scale. |
| Assessment Limits / Content Constraints | Tasks may or may not have context. |
| DOK(s) | 1, 2, or 3 |
| Calculator | NEUTRAL – a calculator may or may not be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a drawing of an object and a scaled drawing of the same object, solve for missing lengths.<br><br>Given a description of the dimensions of an image and the scale, determine the dimensions of the image.<br><br>Given a scaled drawing of an object reproduce the image at a different scale. |

| | |
|---|---|
| **Content Area** | GM: Geometry and Measurement |
| **Cluster** | Construct and describe geometric figures, analyzing relationships among them. |
| **Standard (2019 AL COS)** | 7.GM.18: Construct geometric shapes (freehand, using a ruler and a protractor, and using technology), given a written description or measurement constraints with an emphasis on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. |
| Evidence Statements | The student will construct geometric shapes given a written description or measurement constraints with an emphasis on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. |
| Assessment Limits / Content Constraints | Tasks do not have a context. |
| DOK(s) | 1, 2, or 3 |
| Calculator | NEUTRAL – a calculator may or may not be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Not Allowable |
| Sample Stem Information (as applicable) | Given conditions, draw geometric shapes.<br><br>Use given conditions to determine whether they dictate a unique triangle. |

| | |
|---|---|
| **Content Area** | GM: Geometry and Measurement |
| **Cluster** | Construct and describe geometric figures, analyzing relationships among them. |
| **Standard (2019 AL COS)** | 7.GM.19: Describe the two-dimensional figures created by slicing three-dimensional figures into plane sections. |
| Evidence Statements | The student will describe the two-dimensional figures created by slicing three-dimensional figures into plane sections. |
| Assessment Limits / Content Constraints | Tasks have “thin context” or no context. |
| DOK(s) | 1, 2, or 3 |
| Calculator | NEUTRAL – a calculator may or may not be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a three-dimensional figure and a visual demonstration of how a plane will intersect the figure, determine the resulting cross section.<br><br>Given a three-dimensional figure and a description of how a plane will intersect the figure, determine the resulting figure. |

| | |
|---|---|
| **Content Area** | GM: Geometry and Measurement |
| **Cluster** | Solve real-world and mathematical problems involving angle measure, circumference, area, surface area, and volume. |
| **Standard (2019 AL COS)** | 7.GM.20a: Explain the relationships among circumference, diameter, area, and radius of a circle to demonstrate understanding of formulas for the area and circumference of a circle.<br>a. Informally derive the formula for area of a circle. |
| Evidence Statements | The student will informally derive the formula for area of a circle. |
| Assessment Limits / Content Constraints | Tasks may or may not have context. |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Determine the relationship between two attributes of a circle that are not related by the conventional area and circumference formulas. |

| | |
|---|---|
| **Content Area** | GM: Geometry and Measurement |
| **Cluster** | Solve real-world and mathematical problems involving angle measure, circumference, area, surface area, and volume. |
| **Standard (2019 AL COS)** | 7.GM.20b: Explain the relationships among circumference, diameter, area, and radius of a circle to demonstrate understanding of formulas for the area and circumference of a circle.<br>b. Solve area and circumference problems in real-world and mathematical situations involving circles. |
| Evidence Statements | The student will solve area and circumference problems in real-world and mathematical situations involving circles. |
| Assessment Limits / Content Constraints | Tasks may or may not have context.<br><br>Tasks may require answers to be written in terms of π. |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given the area or circumference of a circle, determine radius, diameter, circumference or area.<br><br>Given the radius or diameter of a circle, determine the area or circumference of the circle. |

| | |
|---|---|
| **Content Area** | GM: Geometry and Measurement |
| **Cluster** | Solve real-world and mathematical problems involving angle measure, circumference, area, surface area, and volume. |
| **Standard (2019 AL COS)** | 7.GM.21: Use facts about supplementary, complementary, vertical, and adjacent angles in multi-step problems to write and solve simple equations for an unknown angle in a figure. |
| Evidence Statements | The student will use facts about supplementary, complementary, vertical, and adjacent angles in multi-step problems to write and solve simple equations for an unknown angle in a figure. |
| Assessment Limits / Content Constraints | Tasks may or may not have context.<br><br>Tasks involving writing or solving an equation should not go beyond the equation types $px + q = r$ and $p(x + q) = r$, where $p$, $q$, and $r$ are specific rational numbers. |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given an angle relationship and a measure of one of the angles, determine the other angle.<br><br>Given a drawing of angles in a relationship, determine an unknown angle. |

| | |
|---|---|
| **Content Area** | GM: Geometry and Measurement |
| **Cluster** | Solve real-world and mathematical problems involving angle measure, circumference, area, surface area, and volume. |
| **Standard (2019 AL COS)** | 7.GM.22: Solve real-world and mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right rectangular prisms. |
| Evidence Statements | The student will solve real-world and mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right rectangular prisms. |
| Assessment Limits / Content Constraints | Tasks may or may not have context. |
| DOK(s) | 1, 2, or 3 |
| Calculator | YES – a calculator will be available for items |
| Item Type(s) | MC, MS, SA, TE |
| Context | Allowable |
| Sample Stem Information (as applicable) | Given a drawing of a rectangular or triangular prism, determine the volume or surface area.<br><br>Given a description of a rectangular or triangular prism, determine the volume or surface area.<br><br>Given a compound two-dimensional figure made up of polygons, determine the area of the figure. |

Appendix A: Sample Items

# Sample Items

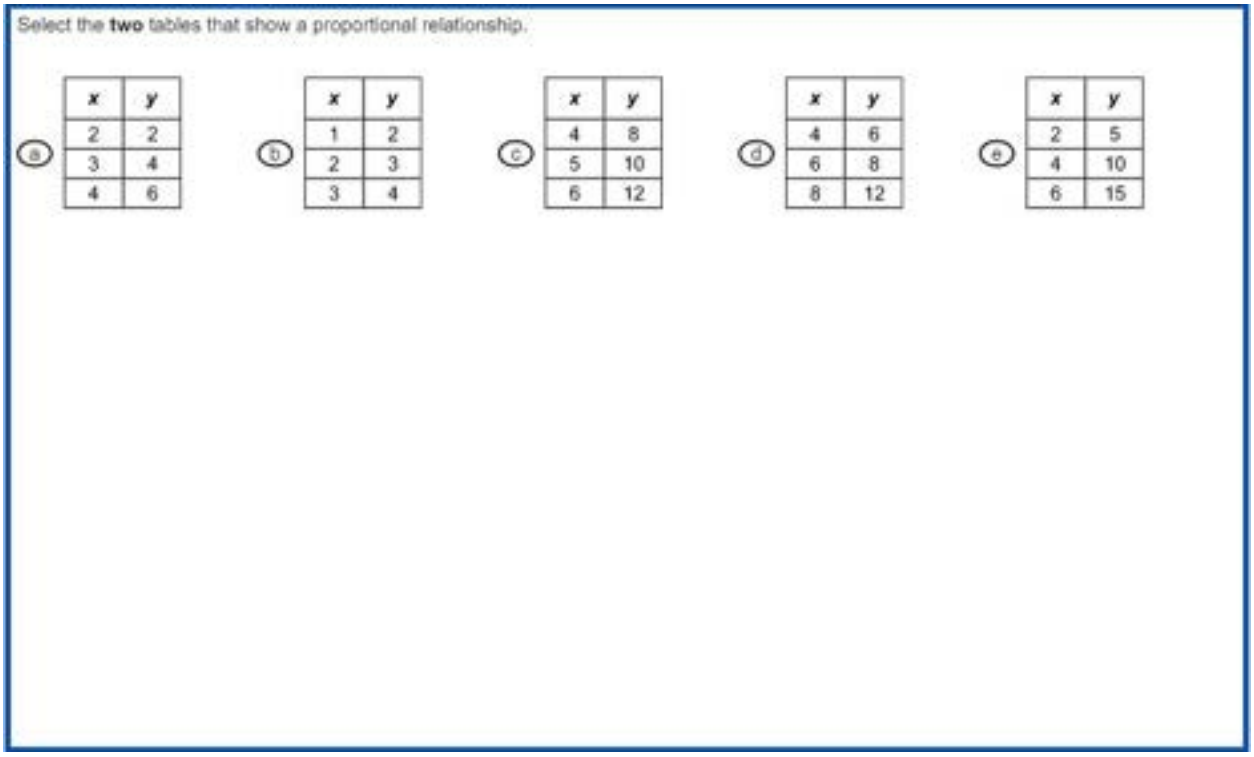
## Appendix A: Sample Items

### Sample Item 1


| Item Information | | Option Annotations |
|---|---|---|
| Item Type | Multiple Choice | A. The student multiplies 1/3 and 1/6.<br>B. The student divides 1/6 by 1/3.<br>C. Correct<br>D. The student multiplies 1/3 and 1/6 and then takes the reciprocal. |
| Page Reference | 9 | |
| Alignment | 7.PR.1 | |
| Depth of Knowledge | 2 | |
| Answer Key | C | |

## Appendix A: Sample Items

### Sample Item 2

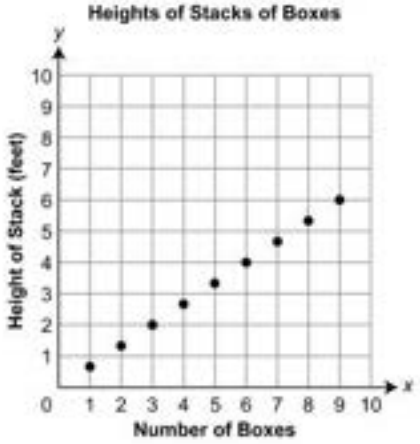



| Item Information | | Option Annotations |
|---|---|---|
| Item Type | Multiple Select | A. The student thinks increasing the input by one each time and increasing the output by two each time makes a proportional relationship.<br>B. The student thinks when the input and output each increase by one makes a proportional relationship.<br>C. Correct<br>D. The student thinks increasing the input by two each time and increasing the output by two each time makes a proportional relationship.<br>E. Correct |
| Page Reference | 10 | |
| Alignment | 7.PR.2a | |
| Depth of Knowledge | 1 | |
| Answer Key | C, E | |

## Appendix A: Sample Items

### Sample Item 3

The graph shows the heights, $y$, in feet, of different stacks of $x$ identical boxes.




Select the **three** true statements about the information represented in the graph.

- (a) The point (6, 4) represents the fact that a stack of 6 boxes is 4 feet in height.
- (b) The point (9, 6) represents the fact that a stack of 6 boxes is 9 feet in height.
- (c) The $y$-coordinate of the point with an $x$-coordinate of 1 represents the height of a single box.
- (d) In this context, it does not make sense to have a $y$-coordinate that is not a whole number.
- (e) The relationship between the height of a stack of boxes and the number of boxes in the stack is proportional.
- (f) A stack of boxes that contains 1 more box than a shorter stack will have a height that is 1.5 feet greater than the shorter stack.

| Item Information | | Option Annotations |
|---|---|---|
| Item Type | Multiple Select | A. Correct<br>B. The student reversed the meaning of the $x$- and $y$-coordinates.<br>C. Correct<br>D. The student thinks the height of the stack must be a whole number of feet.<br>E. Correct<br>F. The student thinks the height of each box is 1.5 feet. |
| Page Reference | 12 | |
| Alignment | 7.PR.2c | |
| Depth of Knowledge | 2 | |
| Answer Key | A, C, E | |

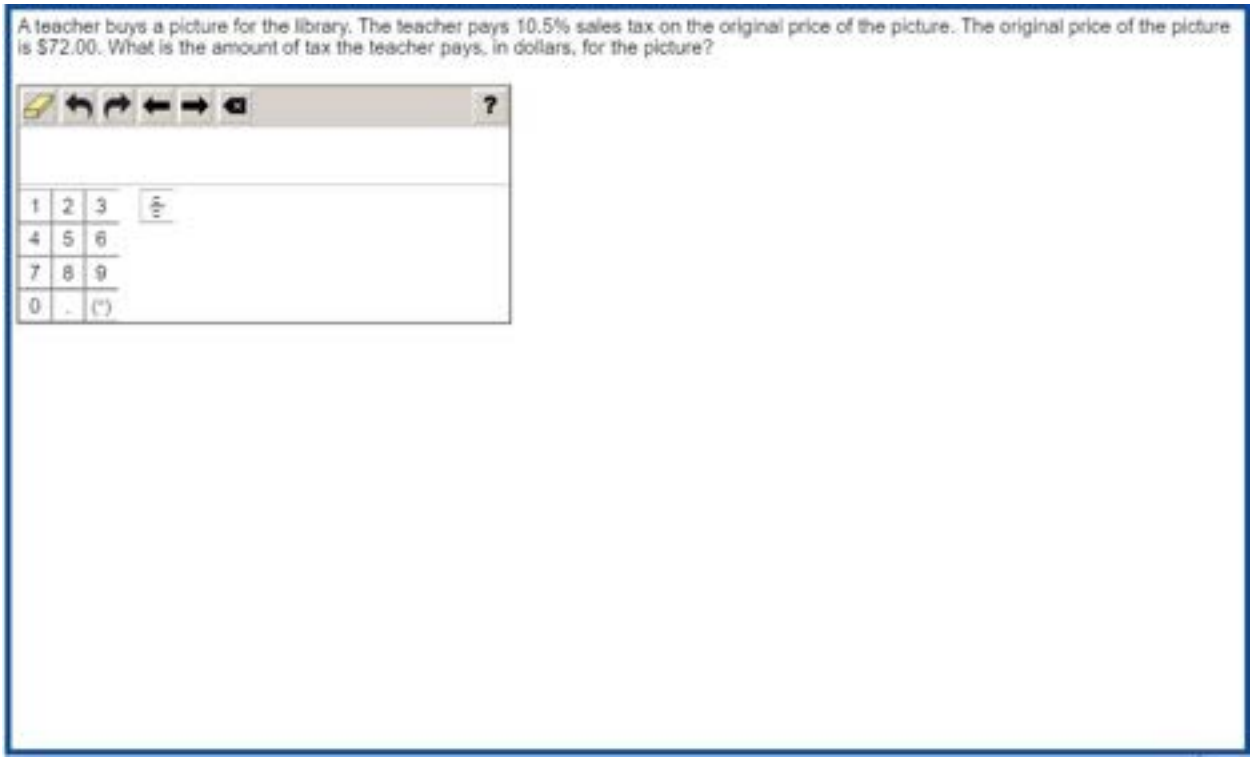
## Appendix A: Sample Items

### Sample Item 4


| Item Information | | Option Annotations |
|---|---|---|
| Item Type | Multiple Choice | A. The student calculates the amount of the discount.<br>B. The student finds 30% of the discount price and then adds it to the discount price.<br>C. Correct<br>D. The student adds 30 to the discount price. |
| Page Reference | 13 | |
| Alignment | 7.PR.3 | |
| Depth of Knowledge | 3 | |
| Answer Key | C | |

## Appendix A: Sample Items

### Sample Item 5




| Item Information | | Answer Key(s) Description |
|---|---|---|
| Item Type | Short Answer | 7.56 (or equivalent) |
| Page Reference | 13 | |
| Alignment | 7.PR.3 | |
| Depth of Knowledge | 2 | |
| Answer Key | (see description) | |

## Appendix A: Sample Items

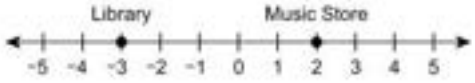
### Sample Item 6


| Item Information | | Option Annotations |
|---|---|---|
| Item Type | Multiple Choice | A. The student changes –8 to 8.<br>B. Correct<br>C. The student changes –8 to 8 and changes the operation without changing –2 to 2.<br>D. The student changes the operation without changing –2 to 2. |
| Page Reference | 16 | |
| Alignment | 7.NSO.4c | |
| Depth of Knowledge | 1 | |
| Answer Key | B | |

## Appendix A: Sample Items

### Sample Item 7

A library and a music store are located on the same straight road. Their locations are shown on a number line.




Each unit on the number line is one kilometer. Which statement **best** describes the distance between the library and the music store?

(a) The distance is ⁻5 kilometers because 2 – (⁻3) = 5 and the opposite of 5 is ⁻5.

(b) The distance is ⁻5 kilometers because 2 – (⁻3) = 5 and the absolute value of 5 is ⁻5.

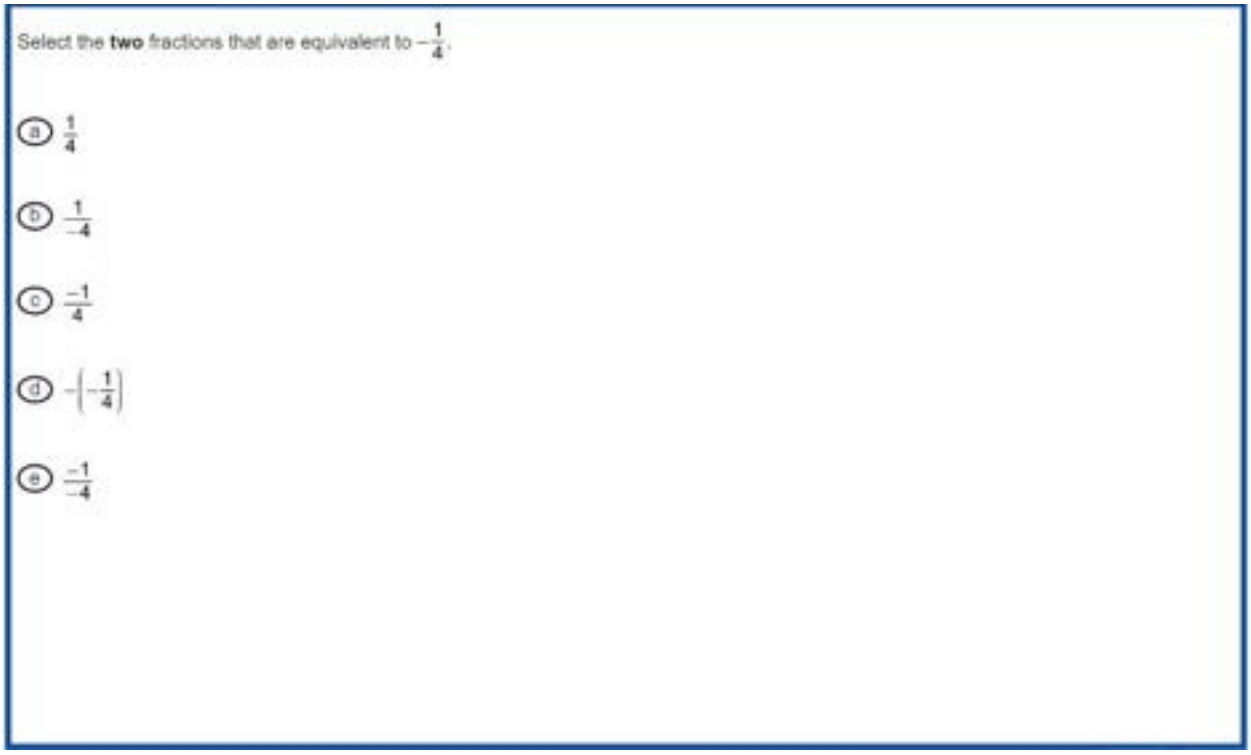
(c) The distance is 5 kilometers because ⁻3 – 2 = ⁻5 and the opposite of ⁻5 is 5.

(d) The distance is 5 kilometers because ⁻3 – 2 = ⁻5 and the absolute value of ⁻5 is 5.

| Item Information | | Option Annotations |
|---|---|---|
| Item Type | Multiple Choice | A. The student finds an incorrect distance.<br>B. The student finds an incorrect distance and makes an incorrect statement about absolute value.<br>C. The student finds the correct distance but makes an incorrect reasoning.<br>D. Correct |
| Page Reference | 17 | |
| Alignment | 7.NSO.4d | |
| Depth of Knowledge | 2 | |
| Answer Key | D | |

## Appendix A: Sample Items

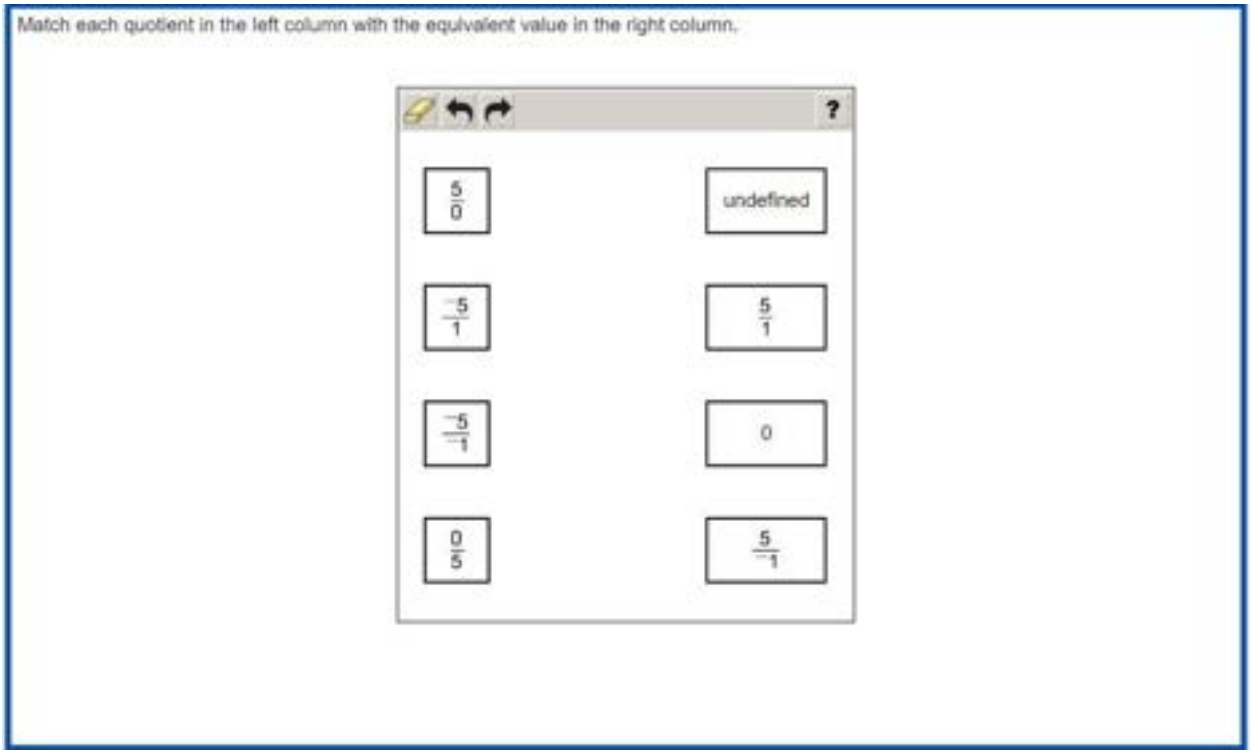
### Sample Item 8




| Item Information | | Option Annotations |
|---|---|---|
| Item Type | Multiple Select | A. The student thinks the opposite is an equivalent value.<br>B. Correct<br>C. Correct<br>D. The student thinks two negative signs makes an equivalent value.<br>E. The student thinks a negative numerator and denominator makes an equivalent value. |
| Page Reference | 19 | |
| Alignment | 7.NSO.4f | |
| Depth of Knowledge | 1 | |
| Answer Key | B, C | |

## Appendix A: Sample Items

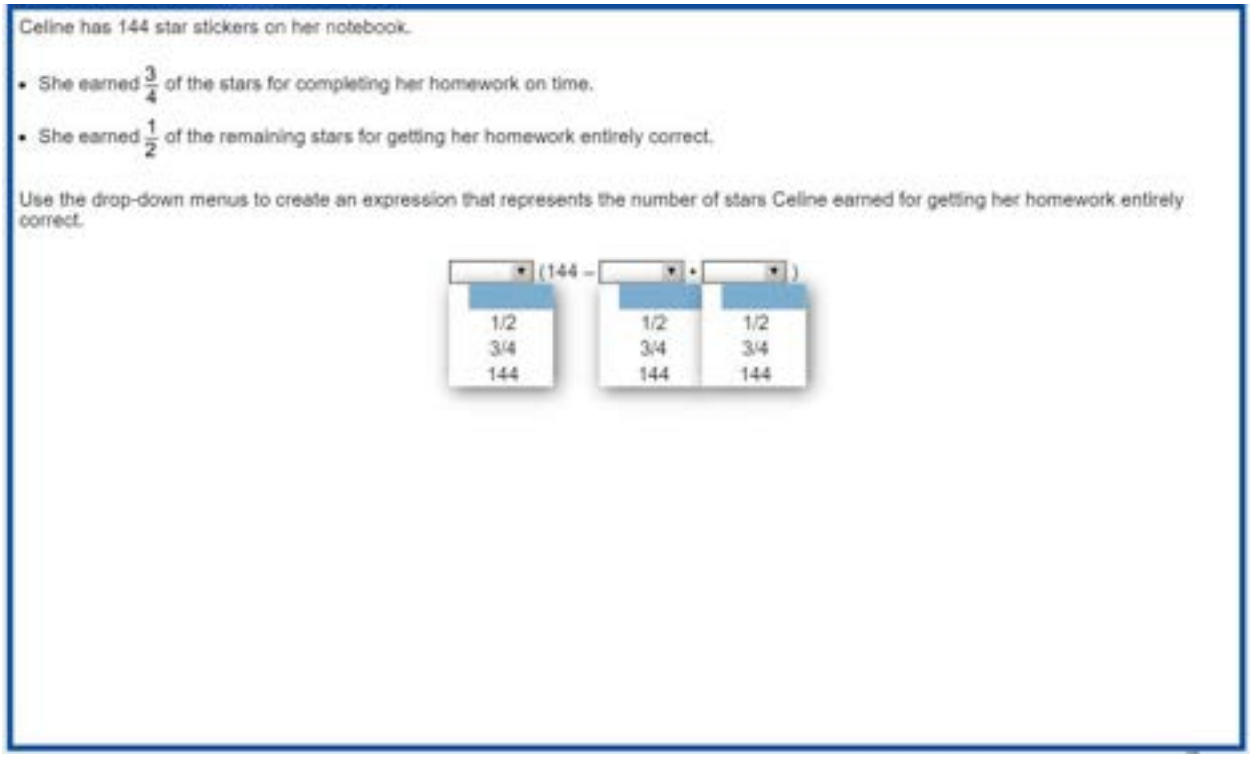
### Sample Item 9




| Item Information | | Answer Key(s) Description |
|---|---|---|
| Item Type | Technology Enhanced | $\frac{5}{0}$ to undefined<br>$\frac{-5}{1}$ to $\frac{5}{-1}$<br>$\frac{-5}{-1}$ to $\frac{5}{1}$<br>$\frac{0}{5}$ to 0 |
| Page Reference | 19 | |
| Alignment | 7.NSO.4f | |
| Depth of Knowledge | 1 | |
| Answer Key | (see description) | |

## Appendix A: Sample Items

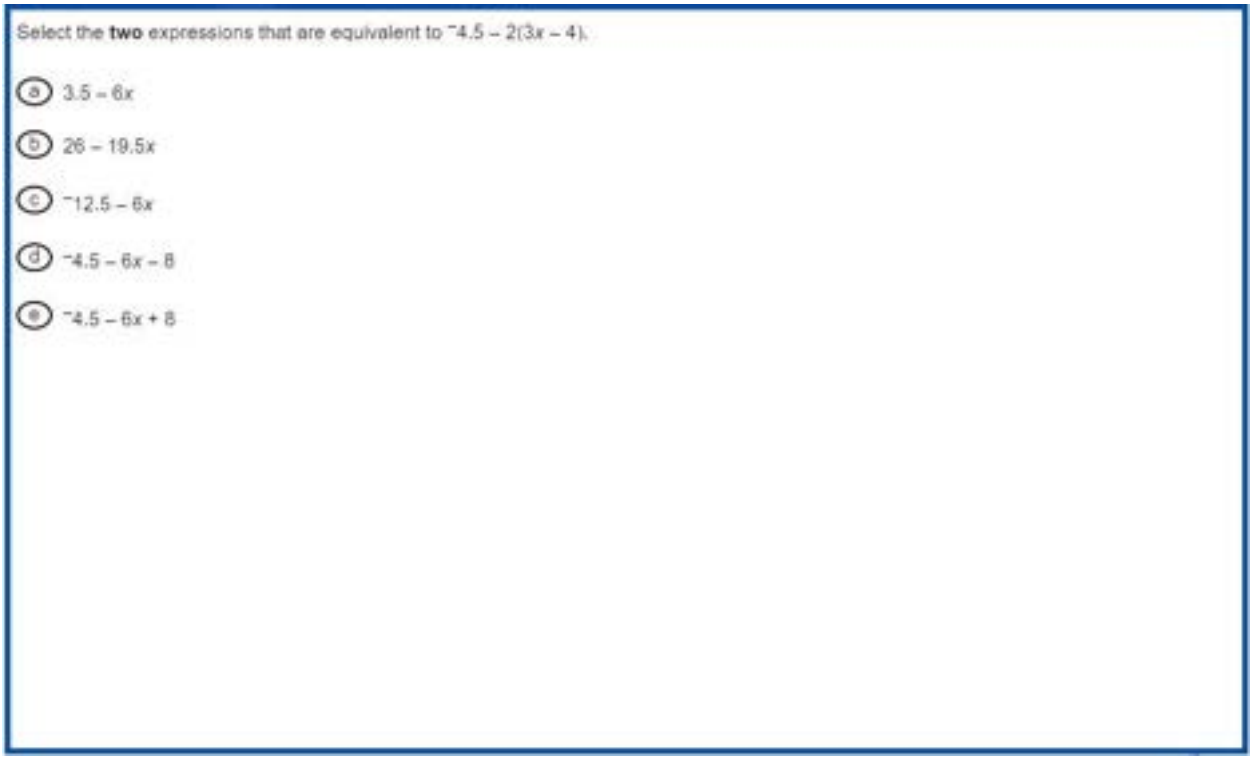
### Sample Item 10




| Item Information | | Answer Key(s) Description |
|---|---|---|
| Item Type | Technology Enhanced | 1/2 (144 – 3/4 • 144)<br>OR<br>1/2 (144 – 144 • 3/4) |
| Page Reference | 21 | |
| Alignment | 7.NSO.5 | |
| Depth of Knowledge | 2 | |
| Answer Key | (see description) | |

## Appendix A: Sample Items

### Sample Item 11




| Item Information | |
|---|---|
| Item Type | Multiple Select |
| Page Reference | 22 |
| Alignment | 7.AF.6 |
| Depth of Knowledge | 2 |
| Answer Key | A, E |

**Option Annotations**

A. Correct
B. The student subtracts −2 from −4.5 and then distributes the difference to the rest of the terms in the expression.
C. The student incorrectly combines the constants in the expression.
D. The student incorrectly distributes the −2 to the last term of the expression.
E. Correct

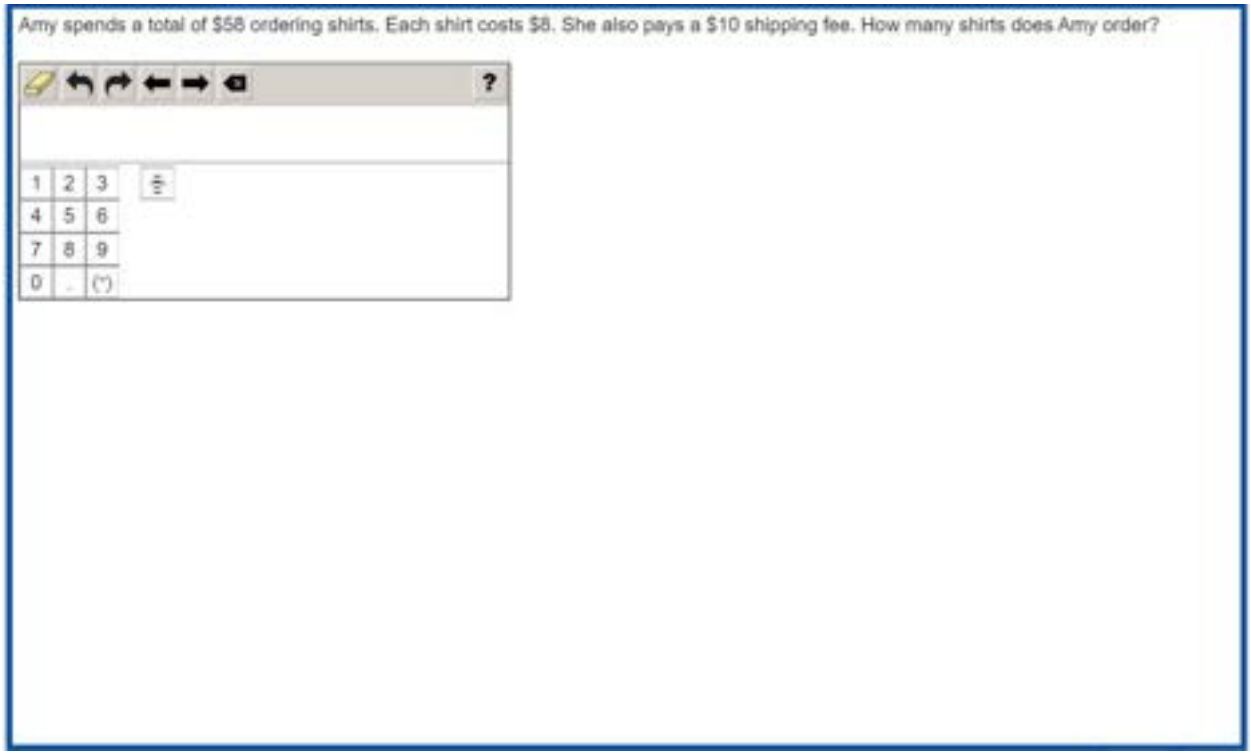
## Appendix A: Sample Items

### Sample Item 12


| Item Information | | Option Annotations |
|---|---|---|
| Item Type | Multiple Choice | A. The student divides 172 by 50.4 and then multiplies by 3.<br>B. The student divides 172 by 25.2 and then multiplies by 3.<br>C. Correct<br>D. The student adds 50.4 to 172 and then divides by 3. |
| Page Reference | 24 | |
| Alignment | 7.AF.8 | |
| Depth of Knowledge | 3 | |
| Answer Key | C | |

## Appendix A: Sample Items

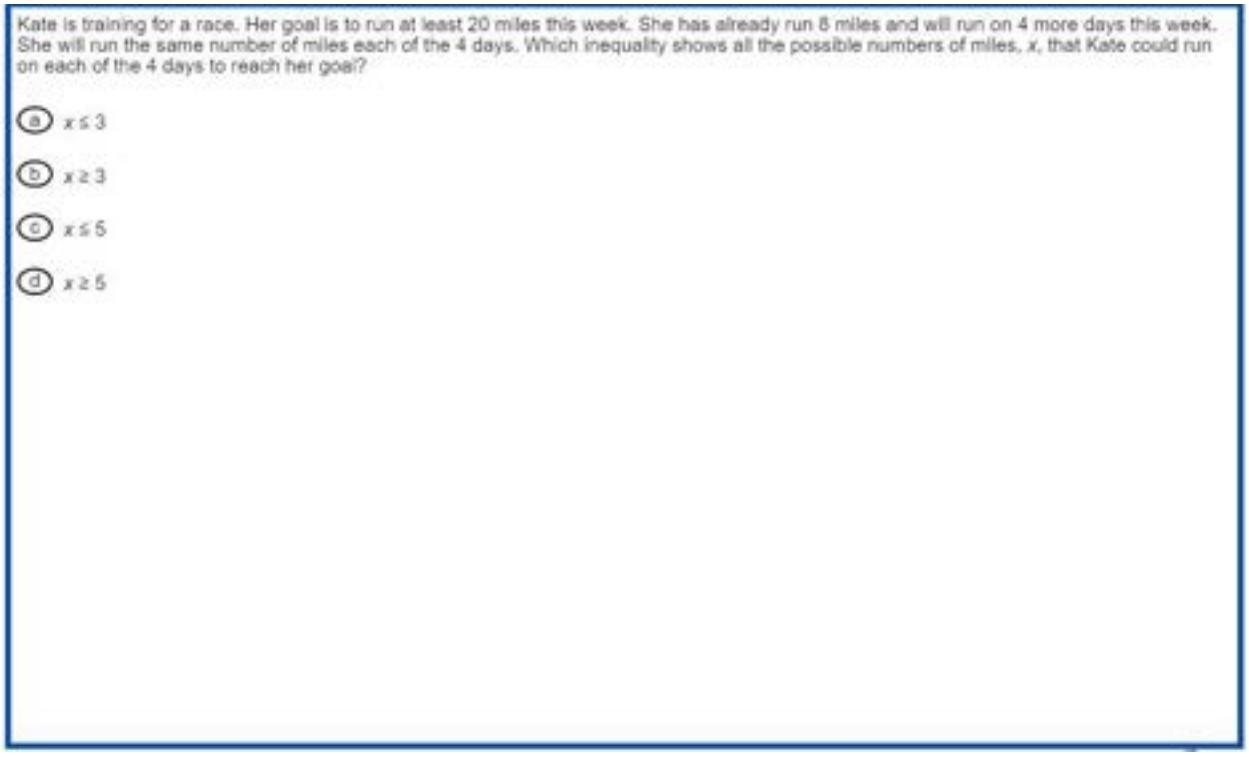
### Sample Item 13




| Item Information | | Answer Key(s) Description |
|---|---|---|
| Item Type | Short Answer | 6 (or equivalent) |
| Page Reference | 25 | |
| Alignment | 7.AF.9a | |
| Depth of Knowledge | 2 | |
| Answer Key | (see description) | |

## Appendix A: Sample Items

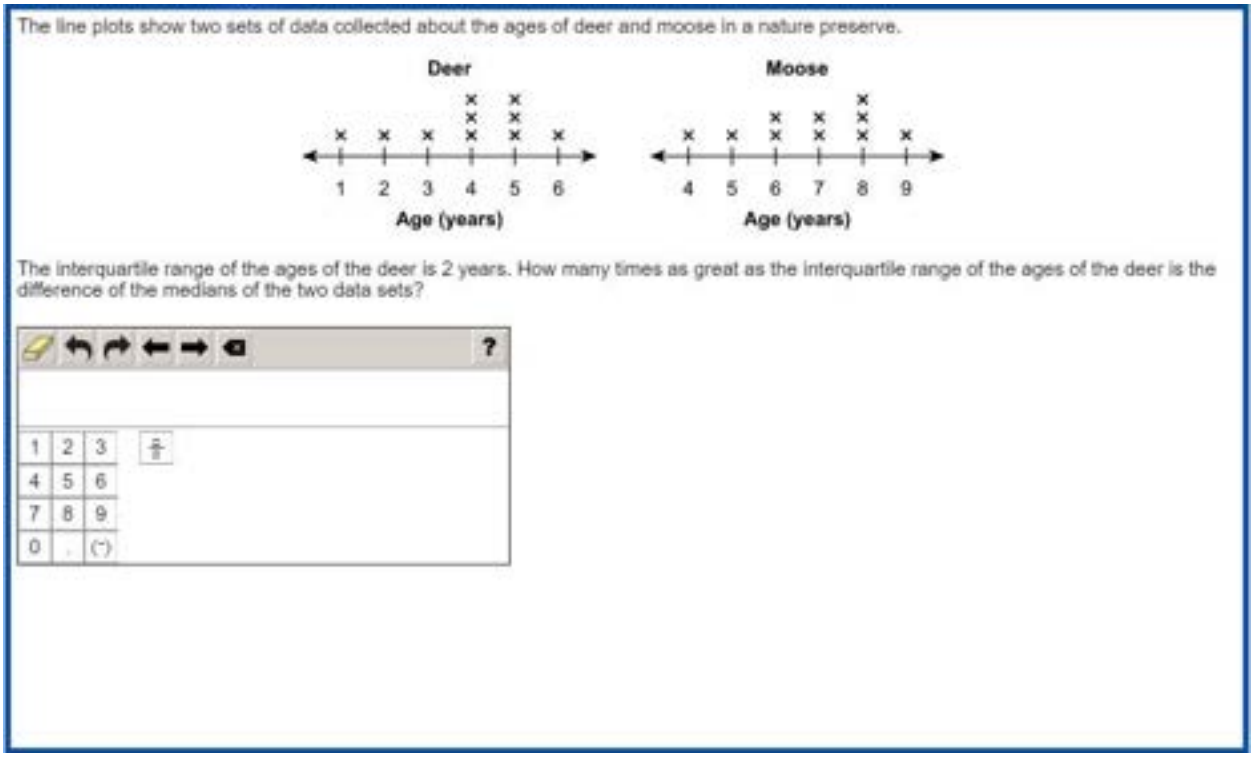
### Sample Item 14




| Item Information | | Option Annotations |
|---|---|---|
| Item Type | Multiple Choice | A. The student uses the wrong inequality symbol.<br>B. Correct<br>C. The student does not subtract the 8 miles and uses the wrong inequality symbol.<br>D. The student does not subtract the 8 miles. |
| Page Reference | 26 | |
| Alignment | 7.AF.9b | |
| Depth of Knowledge | 2 | |
| Answer Key | B | |

## Appendix A: Sample Items

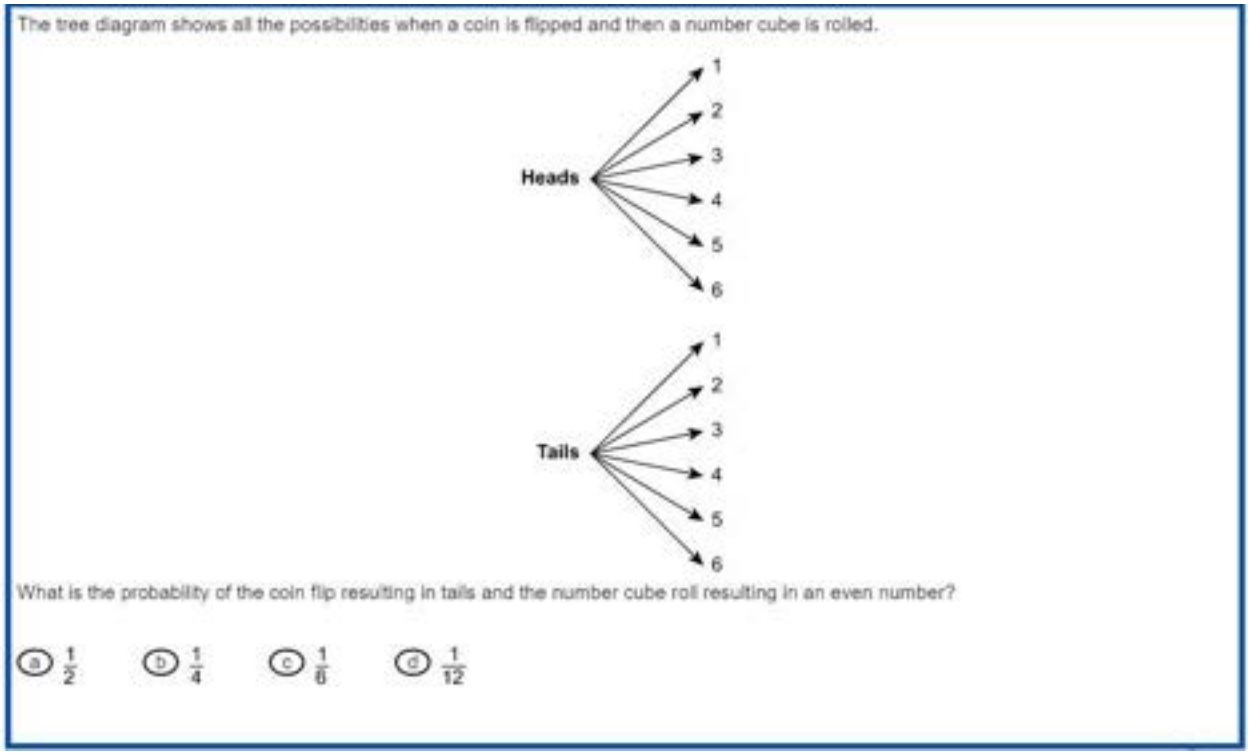
### Sample Item 15




| Item Information | | Answer Key(s) Description |
|---|---|---|
| Item Type | Short Answer | 1.5 (or equivalent) |
| Page Reference | 32 | |
| Alignment | 7.DSP.11 | |
| Depth of Knowledge | 2 | |
| Answer Key | (see description) | |

## Appendix A: Sample Items

### Sample Item 16




| Item Information | | Option Annotations |
|---|---|---|
| Item Type | Multiple Choice | A. The student only considers the probability of tails.<br>B. Correct<br>C. The student finds the probability of a specific number on the number cube without considering the coin.<br>D. The student finds the probability of a specific outcome of a coin toss and a number cube roll. |
| Page Reference | 38 | |
| Alignment | 7.DSP.16a | |
| Depth of Knowledge | 1 | |
| Answer Key | B | |

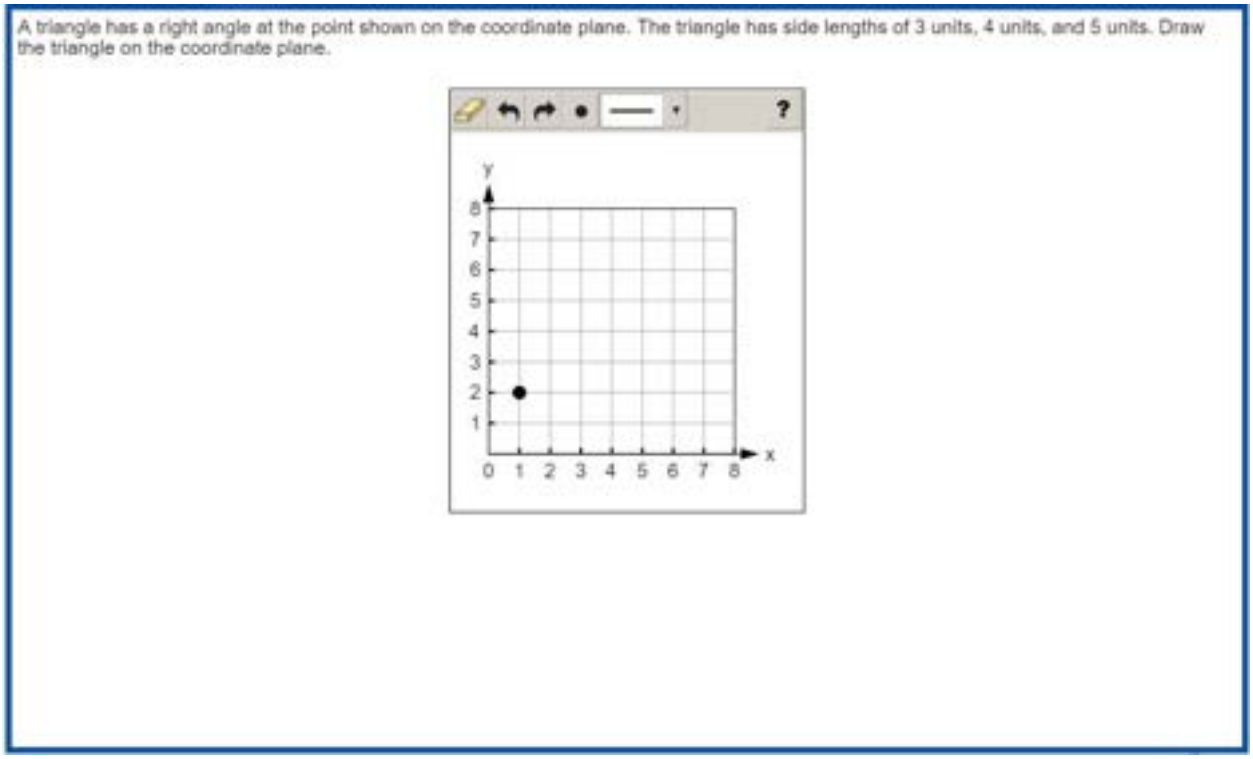
## Appendix A: Sample Items

### Sample Item 17


| Item Information | | Option Annotations |
|---|---|---|
| Item Type | Multiple Choice | A. The student finds the number of outcomes for the second draw.<br>B. The student finds the number of outcomes for the first draw.<br>C. Correct<br>D. The student does not account for the piece of paper not being replaced for the second draw. |
| Page Reference | 40 | |
| Alignment | 7.DSP.16c | |
| Depth of Knowledge | 2 | |
| Answer Key | C | |

## Appendix A: Sample Items

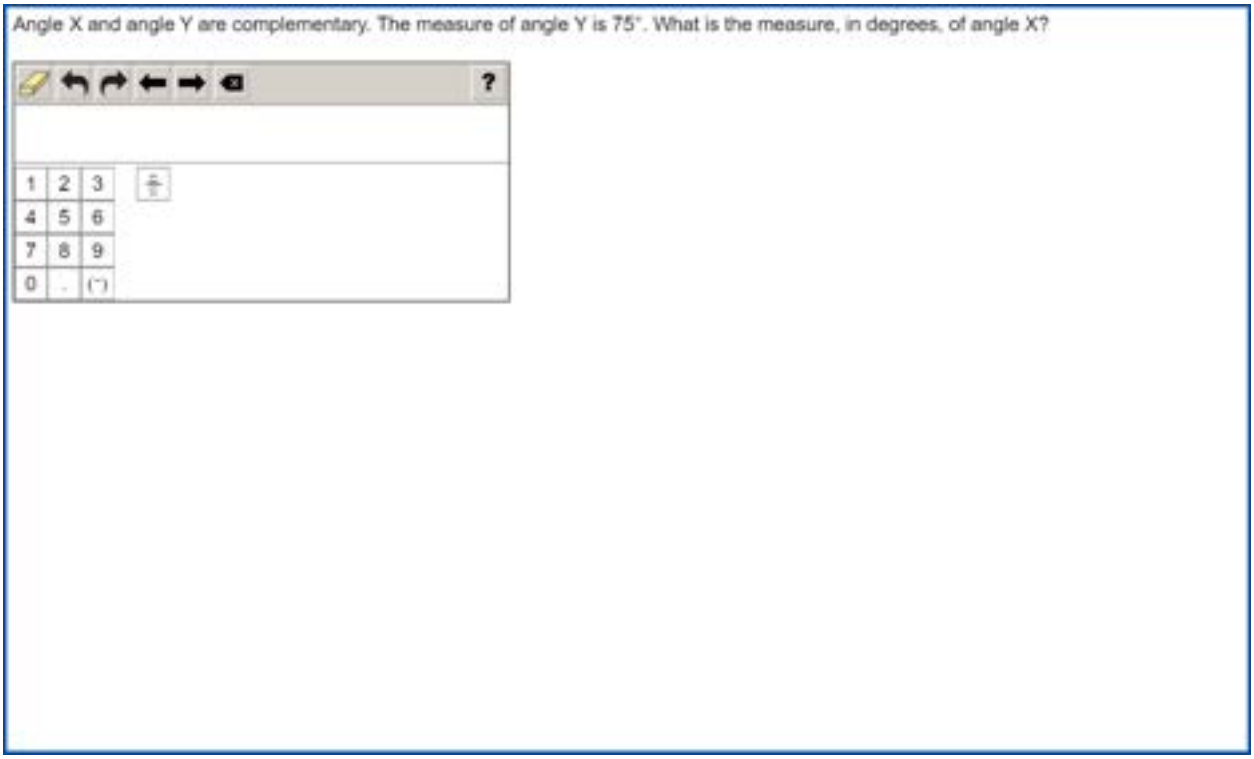
### Sample Item 18




| Item Information | | Answer Key(s) Description |
|---|---|---|
| Item Type | Technology Enhanced | Points plotted at (4, 2) and (1, 6) with line segments connecting all three points to make a triangle.<br><br>OR<br><br>Points plotted at (5, 2) and (1, 5) with line segments connecting all three points to make a triangle. |
| Page Reference | 42 | |
| Alignment | 7.GM.18 | |
| Depth of Knowledge | 1 | |
| Answer Key | (see description) | |

## Appendix A: Sample Items

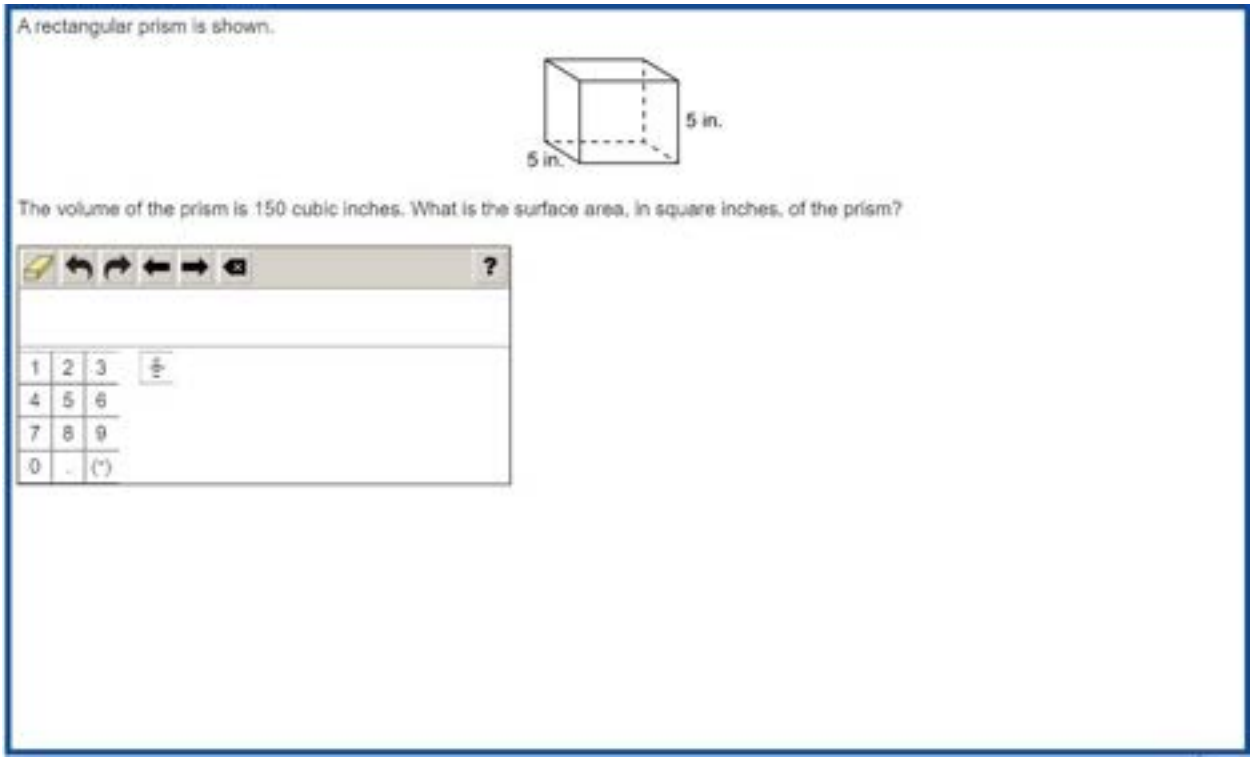
### Sample Item 19




| Item Information | | Answer Key(s) Description |
|---|---|---|
| Item Type | Short Answer | 15 (or equivalent) |
| Page Reference | 46 | |
| Alignment | 7.GM.21 | |
| Depth of Knowledge | 1 | |
| Answer Key | (see description) | |

## Appendix A: Sample Items

### Sample Item 20




| Item Information | | Answer Key(s) Description |
|---|---|---|
| Item Type | Short Answer | 170 (or equivalent) |
| Page Reference | 47 | |
| Alignment | 7.GM.22 | |
| Depth of Knowledge | 2 | |
| Answer Key | (see description) | |