ACAP

Alabama Comprehensive Assessment Program

ALTERNATE

Alabama Comprehensive Assessment Program (ACAP) *Alternate*

Item Specifications

Mathematics

Grade 11

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Mathematics

The *Alabama Comprehensive Assessment Program* (ACAP) *Alternate* item specifications are based on the development of alternate assessments that measure the 2019 *Alabama Alternate Achievement Standards*: *Math*. The item specifications define the purpose of the *ACAP Alternate* 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 2019 *Alabama Alternate Achievement Standards*: *Math* 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:

- Course of Study Standard
- Alternate Achievement Standard
- Content limits/constraints
- Recommended depth of knowledge (DOK) or cognitive levels
- 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 general education students should know and be able to do at a given grade level.

Alternate Achievement Standards: The 2019 *Alabama Alternate Achievement Standards*: *Math* are directly aligned to the 2019 Alabama Course of Study Standards. The 2019 *Alabama Alternate Achievement Standards*: *Math* define what students with the most significant support needs should understand (know) and be able to do at the conclusion of a course or grade.

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.

Standards: Standards define what students should understand (know) and be able to do at the conclusion of a course or grade.

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. 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. The depth of knowledge includes three levels, from the lowest (basic recall) to the highest (strategic thinking). The *ACAP Alternate* 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 Alternate* 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) *Alternate* assessments are composed of various item types. These item types are described below.

Multiple-Choice (MC) Items: MC items have three answer choices, including two 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 Alternate.*

Performance Task Items:

Multiple-Select (MS) Items: MS items are similar in structure to MC items. However, unlike an MC item, an MS item has four options and more than one correct answer. In other words,

multiple responses are required for a given item. A correct response to an MS item is worth two score points in the mathematics *ACAP Alternate*.

Two-Part Multiple-Choice Items: Two-Part Multiple-Choice Items have two questions. The questions may require the student to identify the sides and then angles of a shape, perform computations, identify information of a graph or chart, etc. A correct response to a Two-Part MC item is worth two score points in the mathematics *ACAP Alternate* when both parts are correct.

Item Specifications

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 Alternate Achievement 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 mathematics item specifications are based on the 2019 *Alabama Alternate Achievement Standards*: *Math*.

Grade	**11**
Content Area	**Number and Quantity**
Essential Concept	**Together, irrational numbers and rational numbers complete the real number system, representing all points on the number line, while there exist numbers beyond the real numbers called complex numbers.**
Standard	**Explain how the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for an additional notation for radicals using rational exponents.**
Alternate Achievement Standard	**M.A.AAS.11.1: Determine the value of a quantity that is squared or cubed (limited to perfect squares and perfect cubes).**
Assessment Limits/Content Constraints	Limit to a base of 5 or less for numbers cubed and a base of 10 or less for numbers squared.
DOK(s)	1 or 2
Item Type(s)	MC, EBSR
Sample Item Stem(s)	Here is the numerical expression two cubed. Which value is equivalent to the expression?

Grade	**11**
Content Area	**Algebra and Functions**
Essential Concept	**Expressions can be rewritten in equivalent forms by using algebraic properties, including properties of addition, multiplication, and exponentiation, to make different characteristics or features visible.**
Standard	**Interpret linear, quadratic, and exponential expressions in terms of a context by viewing one or more of their parts as a single entity.** **Example: Interpret the accrued amount of investment P(1 + r)t , where P is the principal and r is the interest rate, as the product of P and a factor depending on time t.**
Alternate Achievement Standard	**M.A.AAS.11.4: Identify an algebraic expression involving addition or subtraction to represent a real-world problem.**
Assessment Limits/Content Constraints	
DOK(s)	1 or 2
Item Type(s)	MC
Sample Item Stem(s)	Jace and Olivia scored eighty-five points on a math project. They also earned extra credit on the presentation worth *x* points. Which expression represents Jace and Olivia's total score?

Grade	**11**
Content Area	**Algebra and Functions**
Essential Concept	**Expressions can be rewritten in equivalent forms by using algebraic properties, including properties of addition, multiplication, and exponentiation, to make different characteristics or features visible.**
Standard	**Use the structure of an expression to identify ways to rewrite it.** **Example: See x4 – y4 as (x2)2 – (y2)2, thus recognizing it as a difference of squares that can be factored as (x2 – y2)(x2 + y2).**
Alternate Achievement Standard	**M.A.AAS.11.5: Solve simple algebraic equations using real world scenarios with one variable using multiplication or division.**
Assessment Limits/Content Constraints	Limit to equations with one-digit, whole-number coefficients and whole-number answers. Include real-world scenarios.
DOK(s)	1 or 2
Item Type(s)	MC
Sample Item Stem(s)	Jim's mom is four times Jim's age. Jim's mom is thirty-two years old. Here is an equation representing their ages. How old is Jim?

Grade	**11**
Content Area	**Algebra and Functions**
Essential Concept	**The structure of an equation or inequality (including, but not limited to, one-variable linear and quadratic equations, inequalities, and systems of linear equations in two variables) can be purposefully analyzed (with and without technology) to determine an efficient strategy to find a solution, if one exists, and then to justify the solution.**
Standard	**Select an appropriate method to solve a system of two linear equations in two variables.** **a. Solve a system of two equations in two variables by using linear combinations; contrast situations in which use of linear combinations is more efficient with those in which substitution is more efficient.** **b. Contrast solutions to a system of two linear equations in two variables produced by algebraic methods with graphical and tabular methods.**
Alternate Achievement Standard	**M.A.AAS.11.9: Identify equivalent expressions given a linear expression using arithmetic operations.**
Assessment Limits/Content Constraints	Limit to the distributive property of multiplication with a one-digit number distributed over a binomial. The exponent and coefficient of x should be 1. Limit equivalent expressions requiring combining like terms to one step.
DOK(s)	1 or 2
Item Type(s)	MC
Sample Item Stem(s)	Here is an expression. Which expression is equivalent to the given expression?

Grade	**11**
Content Area	**Algebra and Functions**
Essential Concept	**Expressions, equations, and inequalities can be used to analyze and make predictions, both within mathematics and as mathematics is applied in different contexts—in particular, contexts that arise in relation to linear, quadratic, and exponential situations.**
Standard	**Create equations and inequalities in one variable and use them to solve problems in context, either exactly or approximately. Extend from contexts arising from linear functions to those involving quadratic, exponential, and absolute value functions.**
Alternate Achievement Standard	**M.A.AAS.11.11: Select an equation or inequality involving one operation (limit to addition or subtraction) with one variable that represents a real-world problem. B) Solve the equation**
Assessment Limits/Content Constraints	Limit to equations and inequalities with positive integer coefficients.
DOK(s)	2 or 3
Item Type(s)	MC, EBSR
Sample Item Stem(s)	A plumbing company charges fifty dollars per hour for its services. For its last job, the plumbing company charged two hundred fifty dollars. Question one: Which equation can be solved to find out the number of hours the last job took? Question two: How many hours did the last job take?

Grade	**11**
Content Area	**Data Analysis, Statistics, and Probability**
Essential Concept	**Mathematical and statistical reasoning about data can be used to evaluate conclusions and assess risks.**
Standard	**Use mathematical and statistical reasoning with bivariate categorical data in order to draw conclusions and assess risk.**
Alternate Achievement Standard	**M.A.AAS.11.32: Make predictions and draw conclusions from two-variable data based on data displays and apply the results to a real-world situation.**
Assessment Limits/Content Constraints	Limit to quadrant one of a ten-by-ten grid when using the coordinate system. Limit data display types to line graphs or line plots.
DOK(s)	2 or 3
Item Type(s)	MC
Sample Item Stem(s)	Here is a graph of the cost of different storage containers based on their radius. Which conclusion about the information is correct?

Grade	**11**
Content Area	**Data Analysis, Statistics, and Probability**
Essential Concept	**Making and defending informed, data-based decisions is a characteristic of a quantitatively literate person.**
Standard	**Design and carry out an investigation to determine whether there appears to be an association between two categorical variables, and write a persuasive argument based on the results of the investigation.**
Alternate Achievement Standard	**M.A.AAS.11.33: When given a two-way table summarizing data on two categorical variables collected from the same subjects, identify possible association between the two variables.**
Assessment Limits/Content Constraints	Avoid questions regarding percentages or probabilities.
DOK(s)	1 or 2
Item Type(s)	MC
Sample Item Stem(s)	Here is a table with the results of a survey that asked tenth and eleventh graders to name their favorite music. Which conclusion about the information is correct?

Grade	**11**
Content Area	**Data Analysis, Statistics, and Probability**
Essential Concept	**The association between two categorical variables is typically represented by using two-way tables and segmented bar graphs.**
Standard	**Analyze the possible association between two categorical variables.** **a. Summarize categorical data for two categories in two-way frequency tables and represent using segmented bar graphs.** **b. Interpret relative frequencies in the context of categorical data (including joint, marginal, and conditional relative frequencies).** **c. Identify possible associations and trends in categorical data.**
Alternate Achievement Standard	**M.A.AAS.11.35: Interpret general trends on a graph (Limited to increase and decrease).**
Assessment Limits/Content Constraints	Limit to graphs that are always increasing, always decreasing, or constant. Avoid graphs that increase on some intervals and decrease on other intervals.
DOK(s)	1 or 2
Item Type(s)	MC
Sample Item Stem(s)	Here are three graphs. Which graph represents a decreasing function?

Grade	**11**
Content Area	**Data Analysis, Statistics, and Probability**
Essential Concept	**Data analysis techniques can be used to develop models of contextual situations and to generate and evaluate possible solutions to real problems involving those contexts.**
Standard	**Generate a two-way categorical table in order to find and evaluate solutions to real-world problems.** **a. Aggregate data from several groups to find an overall association between two categorical variables.** **b. Recognize and explore situations where the association between two categorical variables is reversed when a third variable is considered (Simpson's Paradox).**
Alternate Achievement Standard	**M.A.AAS.11.36: When given a real-world scenario, choose the independent or dependent variable.** **Example: If I buy 2 coffees that cost $2.00 each, the total cost is $4. Which variable is independent?**
Assessment Limits/Content Constraints	Limit to whole numbers. Use visual models when possible.
DOK(s)	1 or 2
Item Type(s)	MC
Sample Item Stem(s)	Here is a table with the cost of bottled water. What is the dependent variable?