

Minnesota Test of Academic Skills (MTAS)

**An Alternate Assessment for Students with the
Most Significant Cognitive Disabilities**

DRAFT

Test Specifications for Mathematics, Grade 11

**Based on the Minnesota K–12 Academic Standards
in Mathematics, 2007**

Minnesota Department of
Education

June 28, 2013

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THE MINNESOTA TEST OF ACADEMIC SKILLS (MTAS)

Introduction

The Minnesota Test of Academic Skills (MTAS) is Minnesota's alternate assessment for students with the most significant cognitive disabilities. It is designed exclusively for use with students who receive special education services and whose participation has been determined on an individual basis by an Individualized Education Program (IEP) team. The Mathematics MTAS is aligned to the Minnesota Academic Standards and the Minnesota Comprehensive Assessments-Series III (MCA-III) in mathematics. A document titled *Alternate Assessment Eligibility Requirements* provides guidance to assist IEP teams in identifying students with the most significant cognitive disabilities who would be appropriately assessed with the MTAS. This document can be found on the Statewide Testing Division page of the Minnesota Department of Education Website. [Visit the MDE Website at http://education.state.mn.us](http://education.state.mn.us) > School Support > Test Administration > Minnesota Tests. Participation information for the MTAS is also included in Chapter 5 of the *Procedures Manual for Minnesota Assessments* located in the General Resources section of the website of the state's test vendor, American Institutes for Research (AIR). [View the General Resources page here.](#)

As required by the Elementary and Secondary Education Act (ESEA), this assessment is aligned with grade-level content standards in mathematics. ESEA requires that all students—including those with the most significant cognitive disabilities—be measured by an assessment aligned to grade-level academic standards, although the breadth, depth and complexity of the grade-level standards may be reduced for alternate assessments or modified to include prerequisite skills.

The Mathematics MTAS is administered to eligible students in grades 3–8 and 11. Students taking the MTAS must be administered the appropriate assessment for their enrolled grade.

Purpose of the MTAS

The MTAS serves a number of purposes:

- It meets the requirements of ESEA by providing Minnesota students who meet the eligibility guidelines for the MTAS with an alternate assessment based on alternate achievement standards that are aligned with grade-level academic standards.
- It promotes access to the general education curriculum for students with significant cognitive disabilities, as required by both ESEA and the Individuals with Disabilities Education Act (IDEA).
- It provides educators with a tool for measuring the progress students are making toward proficiency on academic standards in mathematics.
- It provides results that can be used to inform instruction at the classroom level.

Test Specifications

The test specifications for the grade 11 MTAS in mathematics are presented in this document. Test specifications for the grades 3–8 MTAS in mathematics can be found in *Minnesota Test of Academic Skills: Test Specifications for Mathematics, Grades 3–8*. Beginning in 2011, assessments in grades 3–8 are based on the 2007 revision of the *Minnesota K-12 Academic Standards in Mathematics*. [View the Minnesota K-12 Academic Standards in Mathematics](#). Pending federal or state changes in legislation, the grade 11 assessment will be based on the 2007 version of the academic standards beginning in the 2013–2014 school year.

All tests—from off-the-shelf, norm-referenced tests to customized, standards-based tests like those given in Minnesota—have test specifications. The primary purpose of a set of test specifications is to help test developers build a test that stays consistent over time. Test specifications clarify, define and/or limit how test items will be written to any given strand, substrand, standard or benchmark. Test specifications for the MTAS indicate which strands, standards and benchmarks have been selected as priorities for students with the most significant cognitive disabilities. For each benchmark, task specifications clarify, define and limit how performance tasks should address the

extended benchmarks; they are intended to represent essential understandings and are not intended to describe all instruction.

Test specifications indicate only what is assessed, not what should be taught. Test specifications do not indicate how children should be taught; this remains the responsibility of the classroom teacher who best knows the child.

The MTAS test specifications help achieve the goal of a technically sound instrument that respects teachers' concern for the time students spend taking tests. They have taken into account the impact of the students' cognitive disabilities, their needs for extensive supports, their varying modes of communication, their age and their right to access grade-level curriculum.

As with any test, the MTAS is a sampling of student knowledge and does not test every standard or benchmark. There are standards and benchmarks that cannot be assessed with a standardized test as well as standards and benchmarks that have not been identified as the top priorities for students with the most significant cognitive disabilities. This does not mean that these skills should not be taught or assessed. Students with the most significant cognitive disabilities should receive instruction on the full range of grade-level academic standards to the extent appropriate. The IEP team is responsible for developing an individualized program for each student that addresses identified needs, including, but not limited to, how students will access the general education curriculum as outlined by the Minnesota Academic Standards. [View the Minnesota K-12 Academic Standards.](#)

Prioritizing the Grade-Level Academic Standards

When Minnesota educators helped design the original MTAS, the first step was to prioritize the grade-level academic standards for students with the most significant cognitive disabilities. Panel members, including special educators and content specialists in mathematics, identified benchmarks that, in their view, represented the most critical learning outcomes for this population. The following criteria were established for prioritizing the benchmarks:

- The benchmark is assessed on the MCA.
- The benchmark reflects the pattern of emphasis on the test blueprint for the MCA.
- Proficiency on the benchmark will help the student in the next age-appropriate environment (i.e., the next grade in school or a post-school setting).
- Proficiency on the benchmark will aid future learning in the content area.
- The benchmark can be written as a performance task without creating bias against a particular student population.

In developing the Mathematics MTAS based on the 2007 academic standards, the standards and benchmarks at each grade that are identical or close to those selected for inclusion under the previous academic standards and test specifications were carried forward. Some standards and benchmarks are now assessed in different grade levels than they were for the 2003 academic standards. There are standards and benchmarks that did not appear in the previous academic standards, and MDE evaluated these benchmarks using the criteria described above.

Extended Standards and Extended Benchmarks

Extensions of standards and benchmarks represent a reduction in depth and complexity while maintaining a clear link to the grade-level content standard. For the Mathematics MTAS based on the 2007 academic standards, both extended standards and extended benchmarks were written. Counts of tasks per test form were determined at the

standard level rather than at the benchmark level, as was done in the previous version of the MTAS.

Performance Tasks

The MTAS is designed to allow for appropriate flexibility within a standardized assessment environment. Each student will be given a number of tasks to complete in a one-on-one test administration. The test administrator, who will most likely be the child's classroom teacher, will present each task in a way that allows the student to understand what is being asked (i.e., an appropriate *presentation mode*). It is imperative that each student be given an opportunity to access the content in a way that is appropriate for the individual. For example, students may need manipulatives or illustrations to aid their understanding of the mathematics tasks. Tactile, visual and auditory presentation modes are allowable on the MTAS.

Student Responses

It is critical that students with the most significant cognitive disabilities have a way to show what they know and can do. Clearly, students who meet the guidelines for this alternate assessment would not be appropriately assessed with a multiple-choice test that is designed for general education students. Students with the most significant cognitive disabilities often have ways of communicating what they know and can do that are different from the general education population. Students may communicate through a variety of modes which include, but are not limited to, speaking, using gestures such as eye blinks or using assistive technology such as a language-based augmentative communication device. The critical feature of a meaningful response is that the student clearly communicates a message.

Evaluating Student Performance on Tasks

The teacher uses a scoring rubric to evaluate the student's performance. Test administrators are trained on the use of the scoring rubric in the spring of each year.

Minnesota Test of Academic Skills (MTAS) Scoring Rubric

3	2	1	0
Correct Response	Correct Response with Additional Support	Incorrect Response	Unrelated or No Response
The student responds correctly without assistance.	The student responds correctly to the task after the teacher provides additional support as indicated in the task script.	The student responds incorrectly to the task after the teacher provides additional support as indicated in the task script.	The student does not respond to the task, or the student's response is unrelated to the task.

Overall Considerations

Overall considerations are broad development issues that should be addressed during the development of performance tasks. Each of these issues is considered for all of the tasks developed for the Mathematics MTAS.

1. Each task is written to primarily measure one benchmark; however, other benchmarks may also be reflected in the content of the performance task.
2. Tasks are appropriate for students in terms of grade-level content, age and typical life experiences for the majority of this population.
3. Tasks are developed to allow students with varying modes of communication to demonstrate proficiency, given sufficient instruction and opportunity to learn.
4. Tasks do not disadvantage or offend any segment of the population in regard to age, gender, race, ethnicity, language, religion, socioeconomic status, disability or geographic region.
5. Each task is written to clearly and unambiguously elicit the desired response.
6. A calculator, or any tool functioning as a calculator, may be used on any of the tasks.
7. Tasks are reviewed for content characteristics, potential bias and any issues that may be of concern. Minnesota educators with experience and expertise in special education instruction, mathematics instruction and serving the needs of students with the most significant cognitive disabilities review the performance

tasks for each passage in terms of content, bias (gender, racial/ethnic, linguistic, religious, geographic, socioeconomic and issues related to individuals with disabilities) and psychometric data collected from field testing.

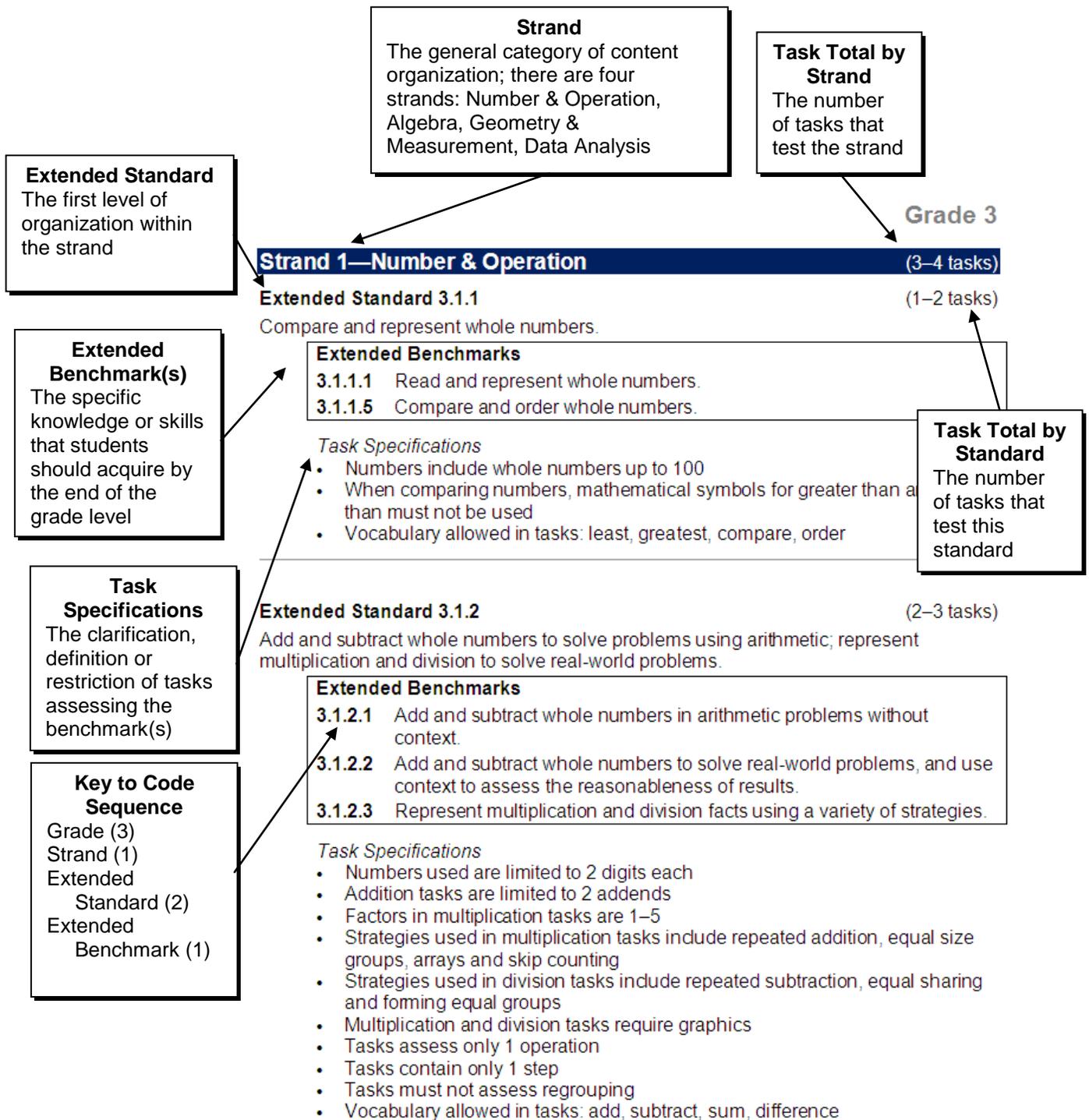
8. Students may use all necessary supports during testing as identified in the IEP. Supports include, but are not limited to, manipulatives, visual aids, number lines, multiplication charts and assistive technology.

Test Design by Grade Level

Each operational administration of the MTAS consists of nine tasks distributed across the four strands of the academic standards as shown below. Additional tasks are field tested during each administration in order to construct assessments in future years.

Grade	Strand	By Strand, Number of:		
		Tasks	Extended Standards	Extended Benchmarks
11	2: Algebra	4-5	2	6
	3: Geometry & Measurement	2-3	3	5
	4: Data Analysis & Probability	2-3	2	4

Guide to Reading the Test Specifications



Explanation of Terms Related to the Grade-Level Tables

Strand: This is the most general categorization of content in the Minnesota Academic Standards. There are four strands in mathematics:

1. Number & Operation (skills assessed in Strands 2, 3 and 4)
2. Algebra
3. Geometry & Measurement
4. Data Analysis & Probability

Extended Standard: Within each strand, standards describe the expectations in mathematics that students must satisfy to meet state requirements. Extended standards represent reductions in the depth, breadth and complexity of the academic standards.

Extended Benchmark: Each standard is divided into several benchmarks. The purpose of benchmarks is to provide details about “the academic knowledge and skills that schools must offer and students must achieve to satisfactorily complete the standards” (Minn. Stat. § 120B.023 (2006)). Benchmarks are intended to "inform and guide parents, teachers, school districts and other interested persons and for use in developing tests consistent with the benchmarks" (Minn. Stat. § 120B.023 (2006)). Extended benchmarks represent reductions in the depth, breadth and complexity of the benchmarks of the academic standards.

Code: Test developers use this code to identify the grade, strand, standard and benchmark to which a performance task is aligned.

Task Specifications: These statements provide more specific clarifications, definitions or restrictions for the benchmark as it is assessed on the MTAS.

Task Total by Strand: This number is the possible number of tasks from a specific strand that could be on the operational test form.

Task Total by Standard: This number is the total number of tasks measuring the indicated standard that could be on the operational test. For example, in Grade 11 Mathematics, four to five tasks are from Strand 2. Of those four to five Strand 2 tasks, one to two tasks are from Standard 1 (9.2.1) and two to three tasks are from Standard 2 (9.2.2).

Grade 11

Strand 2—Algebra

(4-5 tasks)

Extended Standard 9.2.1

(2-3 tasks)

Understand the concept of function and identify important features of functions using graphical methods.

Extended Benchmarks

- 9.2.1.1 Understand the definition of a function.
- 9.2.1.2 Distinguish between functions and other relations defined graphically or in tabular form.
- 9.2.1.3 Find the domain of a function defined graphically or in a real-world context.
- 9.2.1.4 Obtain information and draw conclusions from graphs of functions.

Task Specifications

- Graphic representations for functions will be provided.
- Students will not be asked to provide definitions for mathematical terminology.
- Students may be asked to use the vertical line test to identify a function on a coordinate grid.
- Vocabulary allowed in tasks: function, relation, domain, range, and vocabulary given at previous grades.

Extended Standard 9.2.2

(2-3 tasks)

Recognize linear functions in mathematical situations; represent linear functions with tables, verbal descriptions, symbols and graphs; solve problems involving these functions.

Extended Benchmarks

- 9.2.2.1 Represent and solve problems in various contexts using linear functions.
- 9.2.2.3 Translate between graphs and tables of linear functions.

Task Specifications

- Vocabulary allowed in tasks: *variable* and vocabulary given at previous grades.
- When given the value of one variable, students may be asked to find the value of the other variable.

Strand 3—Geometry & Measurement

(2-3 tasks)

Extended Standard 9.3.1

(1-2 tasks)

Calculate measurements of plane and solid geometric figures.

Extended Benchmark

9.3.1.2 Decompose two-dimensional figures; use decomposition to determine area of various figures.

Task Specifications

- Two dimensional figures may be decomposed into rectangles or triangles.
- The concept of decomposition of geometric figures may be assessed, but tasks will not assess students' understanding of the term *decomposition*.
- Vocabulary allowed in tasks: vocabulary given at previous grades.

Extended Standard 9.3.3

(0-1 tasks)

Know and apply properties of geometric figures to solve real-world and mathematical problems.

Extended Benchmarks

9.3.3.3 Know and apply properties of equilateral, isosceles and scalene triangles to solve problems.

9.3.3.5 Know and apply properties of right triangles, including properties of 45-45-90 and 30-60-90 triangles, to solve problems.

Task Specifications

- Vocabulary allowed in items: equilateral, isosceles, scalene, right triangle, and vocabulary given at previous grades.
- Students will not be asked to define equilateral, isosceles or scalene but may be asked to find an example.

Extended Standard 9.3.4

(1-2 tasks)

Solve real-world and mathematical geometric problems using algebraic methods.

Extended Benchmarks

9.3.4.4 Use coordinate geometry to analyze line segments, including determining lengths, midpoints and slopes.

9.3.4.6 Identify graphic representations of reflections, translations, and scale changes on a coordinate grid

Task Specifications

- Vocabulary allowed in tasks: midpoint, reflection, translation, scale factor, slope, and vocabulary given at previous grades
- Informal terminology for a translation such as *flip* and *slide* may be used when additional support is provided within task.

Grade 11

Strand 4—Data Analysis & Probability

(2-3 tasks)

Extended Standard 9.4.1

(1-2 tasks)

Display and analyze data; use various measures associated with data to draw conclusions, identify trends and describe relationships.

Extended Benchmarks

- 9.4.1.1** Describe data sets using measures of center (mean, median) and spread (range). Know how to use calculators to calculate mean and range.
- 9.4.1.3** Use scatterplots to analyze patterns and describe relationships between two variables. Use regression lines to make predictions.

Task Specifications

- Vocabulary allowed in tasks: mean, median, range, positive trend, negative trend, line of best fit and vocabulary given at previous grades.
- When mean is included in a task, average will be provided for support. For example, “What is the mean, or average, of the numbers in the list.”
- Students will not be asked to make regression lines, but they may be asked to interpret and make predictions based on regression lines.

Extended Standard 9.4.3

(1-2 tasks)

Calculate probabilities and apply probability concepts to solve real-world and mathematical problems.

Extended Benchmarks

- 9.4.3.1** Apply counting procedures, such as the addition principle and tree diagrams, to determine the size of a sample space (the number of possible outcomes).
- 9.4.3.8** Apply probability concepts to real-world situations to make informed decisions.

Task Specifications

- Tasks will assess simple probability only.
- Vocabulary allowed in tasks: likely, unlikely, impossible, certain, and vocabulary given at previous grades.