TN | Department of
Education

TNReady Grades 6–8 Mathematics
2017–18 School Year

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Please note: *Some resource publishers have created materials that contain "TNReady" in the title or within the contents of their instructional materials.* ***The department does not endorse any of these materials as official TNReady products.***

This document provides information about the design of TNReady assessments. It is not intended to be used solely as an instructional resource or as a pacing guide. Districts should consult the Tennessee academic standards when making all instructional decisions, including scope and sequence. The Tennessee academic standards can be found [here](#).

Overview of Grades 6–8 Mathematics Testing Structure

As in the past, each year the state assessment includes both operational and field test items. The testing structure outlined below reflects both the number of operational assessment items and the number of field test items.

For scheduling purposes, subparts can be combined.

Subpart 1* (No Calculator)	Subpart 2 (Calculator)	Subpart 3 (Calculator)
• 40 Minutes • 18–24 Items	• 35 Minutes • 12–17 Items	• 50 Minutes • 14–22 Items

For scheduling purposes, subparts can be combined.

*For the TNReady mathematics assessments, subpart 1 is designed to measure number sense, conceptual understanding, and fluency. Fluency is the result of a process involving the interplay of practice and reasoning over time as opposed to the notion of memorizing facts devoid of meaning. Fluency is a focus on calculating in a manner that is accurate, flexible, and efficient. Subpart I of TNReady is taken without a calculator for this very reason. As a state, we are measuring how efficiently students work with mathematics. In order to be successful, students need to be equipped with a deep, conceptual understanding of Tennessee's grade-level standards, strong number sense, and strategies that allow them to work mathematics fluently. It is not the expectation that all students will finish subpart I. It is the expectation that students who have a comprehensive understanding of their grade level standards and thorough ability to demonstrate fluency, number sense, and true conceptual understanding be able to complete the subpart in the allotted time.

Grades 6–8 Mathematics Blueprints

The blueprints below reflect only operational assessment items. You can find the grades 6–8 mathematics standards here.

In grades 3–8 mathematics, approximately 70 percent of the assessment items gauge student mastery on major work of the grade. Approximately 30 percent of the items gauge student mastery on supporting and additional work.

Grade 6			
	# of Items	# of Score Points	% of Test
Number Relationships • **6.NS.A-Apply and extend previous understandings of multiplication and division to divide fractions by fractions. • 6.NS.B-Compute fluently with multi-digit numbers and find common factors and multiples. • **6.NS.C-Apply and extend previous understandings of numbers to the system of rational numbers.	14–19	17–21	31–38
Ratios and Rates • **6.RP.A-Understand ratio concepts and use ratio reasoning to solve problems.	4–6	4–8	7–15
Expression and Equations • **6.EE.A-Apply and extend previous understandings of arithmetic to algebraic expressions. • **6.EE.B-Reason about and solve one-variable equations and inequalities. • **6.EE.C-Represent and analyze quantitative relationships between dependent and independent variables.	12–16	14–18	25–33
Geometry • 6.G.A-Solve real-world and mathematical problems involving area, surface area, and volume. • 6.SP.A-Develop understanding of statistical variability. • 6.SP.B-Summarize and describe distributions.	5–9	7–11	13–20
Problem Solving	1	4–6	7–11
Total	36–51	*50–60	100

*Math assessments must have a minimum of 50 score points.

**Clusters with asterisks indicate major content of the grade.

Grade 7			
	# of Items	# of Score Points	% of Test
Number Relationships • **7.NS.A-Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	7–9	7–11	13–20
Proportional Reasoning • **7.RP.A-Analyze proportional relationships and use them to solve real-world and mathematical problems.	6–8	6–10	11–18
Expression and Equations • **7.EE.A-Use properties of operations to generate equivalent expressions. • **7.EE.B-Solve real-life and mathematical problems using numerical and algebraic expressions and equations and inequalities.	14–18	16–20	29–36
Geometry and Data • 7.G.A-Draw, construct, and describe geometrical figures and describe the relationships between them. • 7.G.B-Solve real-life and mathematical problems involving angle measure, area, surface area, and volume. • 7.SP.A-Use random sampling to draw inferences about a population. • 7.SP.B-Draw informal comparative inferences about two populations. • 7.SP.C-Investigate chance processes and develop, use, and evaluate probability models. • 7.SP.D-Summarize and describe numerical data sets.	10–15	13–17	24–31
Problem Solving	1	4–6	7–11
Total	38–51	*50–60	100

Math assessments must have a minimum of 50 score points.

***Clusters with asterisks indicate major content of the grade.*

Grade 8			
	# of Items	**# of Score Points**	**% of Test**
Number Relationships • 8.NS.A- Know that there are numbers that are not rational, and approximate them by rational numbers. • **8.EE.A-Work with radicals and integer exponents.	9–11	9–13	16–24
Functions • **8.F.A-Define, evaluate, and compare functions. • **8.F.B-Use functions to model relationships between quantities.	8–11	9–13	16–24
Expression and Equations • **8.EE.B-Understand the connections between proportional relationships, lines, and linear equations. • **8.EE.C- Analyze and solve linear equations and systems of two linear equations.	8–11	9–13	16–24
Geometry and Data • 8.G.A-Understand and describe the effects of transformations on two-dimensional figures and use informal arguments to establish facts about angles. • **8.G.B-Understand and apply the Pythagorean Theorem. • 8.G.C- Solve real-word and mathematical problems involving volume of cylinders, cones, and spheres. • 8.SP.A-Investigate patterns of association in bivariate data. • 8.SP.B-Investigate chance processes and develop, use, and evaluate probability models.	14–17	15–19	27–35
Problem Solving	1	4–6	7–11
Total	40–51	*50–60	100

Math assessments must have a minimum of 50 score points.

***Clusters with asterisks indicate major content of the grade.*

TNReady Grades 6–8 Mathematics Calculator Policy

Central Beliefs

The TNReady Calculator Policy is based on two central beliefs:

1. Calculators are important tools and, in order to be ready for career and college, students need to understand how to use calculators effectively.

2. In order to demonstrate mastery of the mathematics standards, students must demonstrate many skills without reliance on calculators.

Therefore, at all grade levels and in all courses, the math assessment will include both calculator-permitted subparts and calculator-prohibited subparts.

- There will be one calculator-prohibited subpart and two calculator-permitted subparts at all grade levels.

- Information on the types of questions on the calculator-prohibited section of TNReady can be found ([here](#)).

Rationale

Calculator functionalities should align with the mathematics in each grade band. In grades 6–8 mathematics, our state standards focus on **solidifying** a student's computational fluency with rational numbers. Students are also **developing** an understanding of linear graphing. Students should not have calculator functionalities available to them for concepts that are in the developmental stage.

As stated within our central beliefs, students should have the opportunity to interact with technology and the opportunity to demonstrate critical thinking and problem solving with the aid of a calculator. However, in order to provide an equitable assessment experience for all Tennessee students, the type of calculator used by students should be consistent in functionality. As linear graphing is in the developmental phase over this grade band, students do not need full graphing capabilities—they need to be able to demonstrate their conceptual understanding of linear graphing. Thus, sixth through eighth grade students will be allowed a **four-function or scientific** calculator, which does not include any of the prohibited functionalities on the calculator-permitted subparts, such as linear graphing.

Test Administration Guidelines

- It is the responsibility of the test administrator to ensure the regulations outlined in this policy pertaining to calculator use are followed.

- All memory and user-entered programs and documents must be cleared or removed before and after the test.

- A student may use any grade band-specific permitted calculator on the calculator-permitted subparts.

- Students should have access to no more than one handheld calculator device for calculator-

permitted subparts.

- As we transition to online in future years, students will have access to practice with the same calculator functionalities that will be available on the operational assessment on both the item sampler and the practice tests.

Handheld Calculator Types

For grades 6–8, students may use any four-function or scientific calculator, which does not include any of the prohibited functionalities. *Please note: this is not an exhaustive list of calculator types, and students should be familiar with particular functions at the appropriate grade level.*

Examples of __permitted__ calculators:

- Casio FX260
- Casio HS 4 Basic
- Sharp EL344RB
- Sharp ELSI Mate EL-2405A
- TI-15
- TI-30XA
- TI-30IIS
- TI-34
- TI-108

Examples of __permitted__ functionalities:

- Square root ($\sqrt{x}$)
- %
- Fraction manipulation
- Square key (x^2 or x^y)
- Pi (π)
- Trigonometric functions (sine, cosine, tangent)

Examples of __prohibited__ calculators:

- Casio CFX-9970
- HP-40G
- TI-84 plus family
- TI-89
- TI-NSpire (non-CAS) and TI-NSpire-CX (non-CAS)
- TI-NSpire (CAS version)

Examples of <u>prohibited</u> functionalities:

- Graphing capability
- Matrices
- Regression
- Logarithm (log and/or ln) and exponential functions (a^x and/or e^x)
- Any calculator with CAS (computer algebra system) capabilities (including any programs or applications)
- Wireless communication capability
- QWERTY keyboard
- Cell phones, tablets, iPads, etc.

Grades 6–8 Mathematics Reference Sheets

The math assessment will allow reference sheets for all students in **grades five through high school.** The reference sheets are designed to match the intent of our current state standards in math. Below are the math reference sheets for grades 6–8.

TNReady Math Reference Sheet—Grade 6	
1 yard=3 feet 1 mile = 1,760 yards 1 mile = 5,280 feet 1 kilometer=1000 m 1 pound = 16 ounces 1 ton = 2000 pounds 1 kilogram=1000 grams	1 cup = 8 fluid ounces 1 pint = 2 cups 1 quart = 2 pints 1 gallon = 4 quarts 1 liter=1000 milliliters

TNReady Math Reference Sheet—Grade 7	
1 yard=3 feet 1 mile = 1,760 yards 1 mile = 5,280 feet 1 kilometer=1000 m 1 pound = 16 ounces 1 ton = 2000 pounds 1 kilogram=1000 grams	1 cup = 8 fluid ounces 1 pint = 2 cups 1 quart = 2 pints 1 gallon = 4 quarts 1 liter=1000 milliliters Area of a Regular Polygon=$\frac{1}{2}ap$ where a is the apothem length and p is perimeter

TNReady Math Reference Sheet—Grade 8	
1 yard=3 feet 1 mile = 1,760 yards 1 mile = 5,280 feet 1 kilometer=1000 m 1 pound = 16 ounces 1 ton = 2000 pounds 1 kilogram=1000 grams	1 cup = 8 fluid ounces 1 pint = 2 cups 1 quart = 2 pints 1 gallon = 4 quarts 1 liter=1000 milliliters Area of a Regular Polygon=$\frac{1}{2}ap$ where a is the apothem length and p is perimeter

TNReady Grades 6–8 Mathematics Item Types

This provides descriptions of TNReady item types for the 2017–18 school year. For further information about test structure, please refer to the assessment blueprints. For sample items, please see the practice tests posted to [EdTools](#).

Multiple choice: These are items with four answer options, only one of which is correct.

Multiple select: These are items with more than four answer choices with multiple correct responses. In grades 6–8, sometimes the number of correct responses will be indicated (e.g., "choose the two correct answers"), but sometimes the number of correct responses will not be indicated (e.g., "select all of the correct answers"). These are item dependent and based on the standard.

Fill in the blank: Students must provide their mathematical solution to a problem. No written explanation is required. These are currently hand scored.

Integrated items: These are multipart, 4–6-point questions that ask students to assimilate information from multiple grade-level domains. They may require background knowledge from previous grades.

Two-part items: These are items with two parts, A and B, worth a total of two points. These are scored in two different ways depending on their type.

>	**Type 1:** The two parts of these items work independently of one another, and they are scored independently. Students can get one point for getting only part A correct, one point for only getting part B correct, or two points for getting both parts A and B correct.
>	**Type 2:** The two parts of these items are dependent on one another. These occur when students must use their answer from part A to create their answer for Part B. If a student misses part A but uses their answer correctly to solve part B, they would get one point for their part B answer.

Graphing: Students will be asked to provide a graphical representation. These may be on a number line or on a coordinate plane. All graphing items are currently hand scored.

Matching table: These items are tables where students are asked to match what appears on each row of a table with a correct response located in the columns of the table.