

TNReady High School Integrated Mathematics 2016–17 School Year

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High School 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 assessment items.

Session 1 (No Calculator)	Session 2 (Calculator)	Session 3 (Calculator)
35 Minutes • 11-15 Items	55 Minutes • 15-21 Items	55 Minutes • 10-16 Items • 2 Integrated Items*

**Integrated Items: 4-6 point questions that ask students to assimilate information from multiple grade-level domains. They may require background knowledge from previous grades. For 2016-17, both integrated items are field test items.*

High School Integrated Mathematics Blueprints

The blueprints below reflect only operational assessment items.

For high school mathematics, approximately 60 percent of the assessment items gauge student mastery on major work of the grade. Approximately 40 percent of the items gauge student mastery on supporting and additional work.

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

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

Integrated Math I			
	# of Items	# of Score Points	% of Test
Structure and Operations <ul style="list-style-type: none"> N.Q.A- Reason quantitatively and use units to solve problems. **A.SSE.A- Interpret the structure of expressions. A.SSE.B- Write expressions in equivalent forms to solve problems. 	4-6	4-8	8-13
Equations and Inequalities <ul style="list-style-type: none"> **A.CED.A- Create equations that describe numbers or relationships. **A.REI.B- Solve equations and inequalities in one variable. A.REI.C- Solve systems of equations. **A.REI.D- Represent and solve equations and inequalities graphically. 	9-13	11-15	22-25
Functions <ul style="list-style-type: none"> **F.IF.A- Understand the concept of a function and use function notation. **F.IF.B- Interpret functions that arise in applications in terms of the context. F.IF.C- Analyze functions using different representations. **F.BF.A- Build a function that models a relationship between two quantities. F.LE.A- Construct and compare linear, quadratic, and exponential models and solve problems. F.LE.B- Interpret expressions for functions in terms of the situation they model. 	12-17	15-19	30-32
Geometry and Interpreting Data <ul style="list-style-type: none"> G.CO.A- Experiment with transformations in the plane. **G.CO.B- Understand congruence in terms of rigid motions. **G.CO.C- Prove geometric theorems. S.ID.A- Summarize, represent, and interpret data on a single count or measurement variable. S.ID.B- Summarize, represent, and interpret Data on two categorical and quantitative variables. **S.ID.C- Interpret linear models. 	13-16	14-18	28-30
Total	38-52	*50-60	100

Integrated Math II			
	# of Items	# of Score Points	% of Test
Structure and Operations <ul style="list-style-type: none"> • **N.RN.A–Extend the properties of exponents to rational exponents. • N.RN.B–Use properties of rational and irrational numbers. • N.CN.A–Perform arithmetic operations with complex numbers. • N.Q.A–Reason quantitatively and use units to solve problems. • **A.SSE.A–Interpret the structure of expressions. • **A.SSE.B–Write expressions in equivalent forms to solve problems. • **A.APR.A–Perform arithmetic operations on polynomials. 	13–18	16–21	32–35
Equations and Inequalities <ul style="list-style-type: none"> • N.CN.C–Use complex numbers in polynomial identities and equations. • **A.CED.A–Create equations that describe numbers or relationships. • **A.REI.A–Understand solving equations as a process of reasoning and explain the reasoning. • **A.REI.B–Solve equations and inequalities in one variable. • A.REI.C–Solve systems of equations. 	7–12	10–14	20–23
Functions <ul style="list-style-type: none"> • **F.IF.B–Interpret functions that arise in applications in terms of the context. • F.IF.C–Analyze functions using different representations. • F.BF.A–Build a function that models a relationship between two quantities. • F.BF.B–Build new functions from existing functions. 	6–9	7–11	14–18
Geometry and Interpreting Data <ul style="list-style-type: none"> • **G.SRT.A–Understand similarity in terms of similarity transformations. • **G.SRT.B–Prove theorems involving similarity. • **G.SRT.C–Define trigonometric ratios and solve problems involving right triangles. • G.GMD.A–Explain volume formulas and use them to solve problems. • S.ID.B–Summarize, represent, and interpret data on two categorical and quantitative variables. • S.CP.A–Understand independence and conditional probability and use them to interpret data. • S.CP.B–Use the rules of probability to compute probabilities of compound events in a uniform probability model. 	9–12	10–14	20–23
Total	35–51	*50–60	100

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

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

Integrated Math III			
	# of Items	# of Score Points	% of Test
Structure and Operations <ul style="list-style-type: none"> N.Q.A–Reason quantitatively and use units to solve problems. **A.SSE.A–Interpret the structure of expressions. **A.SSE.B–Write expressions in equivalent forms to solve problems. **A.APR.B–Understand the relationship between zeros and factors of polynomials. A.APR.C–Use polynomial identities to solve problems. A.APR.D–Rewrite rational expressions. 	8–15	13–17	26–28
Equations and Inequalities <ul style="list-style-type: none"> **A.CED.A–Create equations that describe numbers or relationships. **A.REI.A–Understand solving equations as a process of reasoning and explain the reasoning. **A.REI.D–Represent and solve equations. G.GPE.A–Translate between the geometric description and the equation for a conic section. **G.GPE.B–Use coordinates to prove simple geometric theorems algebraically. 	12–15	13–17	26–28
Functions <ul style="list-style-type: none"> **F.IF.B–Interpret functions that arise in applications in terms of the context. F.IF.C–Analyze functions using different representations. F.BF.B–Build new functions from existing functions. F.LE.A–Construct and compare linear, quadratic, and exponential models and solve problems. F.TF.A–Extend the domain of trigonometric functions using the unit circle. F.TF.B–Model periodic phenomena with trigonometric functions. F.TF.C–Prove and apply trigonometric identities. 	6–8	6–10	12–17
Geometry and Interpreting Data <ul style="list-style-type: none"> G.CO.D–Make geometric constructions. G.C.A–Understand and apply theorems about circles. G.C.B–Find arc lengths and areas of sectors of circles. **G.MG.A–Apply geometric concepts in modeling situation. G.GMD.B–Visualize relationships between two–dimensional and three–dimensional objects. S.ID.A–Summarize, represent, and interpret data on a single count or measurement variable. S.ID.B–Summarize, represent, and interpret data on two categorical and quantitative variables. S.IC.A–Understand and evaluate random processes underlying statistical experiments. **S.IC.B–Make inferences and justify conclusions from sample surveys, experiments, and observational studies. 	11–14	12–16	24–27
Totals	37–52	*50–60	100

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

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

TNReady High School 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 high school mathematics, our state standards focus on **solidifying** a student's ability to connect multiple representations for course appropriate function types. Students are also **developing** an understanding of solving multiple types of algebraic equations. 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. In order to provide an equitable assessment experience for all Tennessee students, the type of calculator used by students should be consistent in functionality. Since connection of multiple representations is in the solidifying phase over this grade band, students can have a calculator with full graphing capabilities. However, students do not need access to calculators with CAS (computer algebra systems). Thus, high school students will be allowed a **four-function, scientific, or graphing** calculator, which does not include any of the prohibited functionalities, on the calculator permitted subparts.

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. For calculator permitted subparts, students may use the platform embedded online calculator or a handheld calculator provided by the school/district or one owned personally. **Students may use either or both during the test.**
- Students should have access to no more than one handheld calculator device for calculator-permitted subparts.
- 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

Students may use any four-function, scientific, or graphing 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:

- TI-108
- Casio HS 4 Basic
- Sharp ELSI Mate EL-2405A
- TI-15
- TI-30
- Casio FX260
- Sharp EL344RB
- TI-84 plus family
- TI-NSpire (non-CAS) and TI-NSpire-CX (non-CAS)

Examples of permitted functionalities:

- Square root ($\sqrt{\quad}$)
- %
- Fraction manipulation
- Graphing capability
- Data Entry
- Square key (x^2 or x^y)
- Pi ($\square\square$)
- Trigonometric functions (sine, cosine, tangent)
- Matrices
- Regression

Examples of prohibited calculators:

- TI-89
- TI-NSpire (CAS version)
- HP-40G
- Casio CFX-9970

Calculator functionalities that are prohibited:

- Any calculator with CAS (computer algebra system) capabilities (including any programs or applications)
- Wireless communication capability
- QWERTY keyboard
- Cell phones, tablets, iPads, etc.

High School Mathematics Reference Sheets

The math assessment will allow reference sheets for all students in grades 5 through high school. The reference sheets are designed to match the intent of our current state standards in math. Below is the math reference sheet for high school.

Math Reference Sheet, High School	
1 inch = 2.54 centimeters 1 meter = 39.37 inches 1 mile = 5,280 feet 1 mile = 1,760 yards 1 mile = 1.609 kilometers 1 kilometer = 0.62 mile 1 pound = 16 ounces 1 pound = 0.454 kilograms 1 kilogram = 2.2 pounds 1 ton=2000 pounds 1 cup = 8 fluid ounces 1 pint = 2 cups 1 quart = 2 pints 1 gallon = 4 quarts 1 gallon = 3.785 liters 1 liter = 0.264 gallons 1 liter = 1000 cubic centimeters	Pythagorean Theorem: $a^2 + b^2 = c^2$ Quadratic Formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ Arithmetic Sequence: $a_n = a_1 + (n-1)d$ Geometric Sequence: $a_n = a_1 r^{n-1}$ Finite Geometric Series: $S_n = \frac{a_1(1 - r^n)}{1 - r}$ Degrees: 1 degree = $\frac{\pi}{180}$ radians Radians: 1 radian = $\frac{180}{\pi}$ degrees