



Curriculum and Instruction – Mathematics

Quarter 4

Applied Mathematical Concepts

Quarter 1	Quarter 2	Quarter 3	Quarter 4
Linear Programming, Organizing and Interpreting Data, Data Descriptions	Probability and Counting Rules, Probability Distributions	Normal Probability Distribution, Confidence Intervals, Financial Mathematics	Financial Mathematics (cont.), Logic, Boolean Algebra
August 6 2018 – October 5, 2018	October 15, 2018 – December 19, 2018	January 7, 2019 – March 8, 2019	March 18, 2019 – May 23, 2019
AM.A.LP.A.1	AM.D.CR.A.1	AM.D.ND.A.1	AM.G.L.A.1
AM.A.LP.A.2	AM.D.CR.A.2	AM.D.ND.A.2	AM.G.L.A.2
AM.A.LP.B.3	AM.D.CR.A.3	AM.D.CI.A.1	AM.G.L.A.3
AM.A.LP.B.4	AM.D.CR.A.4	AM.D.CI.A.2	AM.G.L.A.4
AM.D.ID.A.1	AM.D.CR.A.5	AM.D.CI.A.3	AM.G.L.B.5
AM.D.ID.A.2	AM.D.CR.B.7	AM. A. PS. A.1	AM.G.L.B.6
AM.D.ID.A.3	AM.D.CR.B.8	AM.N.NQ.A.1	AM.G.L.B.7
AM.D.ID.A.4	AM.D.CR.B.9	AM.N.NQ.A.2	AM.G.L.B.8
AM. A. PS. A.1	AM.D.CR.B.10	AM.N.NQ.A.3	AM.A.LB.A.1
AM.D.CR.B.10	AM.D.ID.A.4	AM.N.NQ.A.4	AM.A.LB.A.2
	AM.D.ID.A.5	AM.N.NQ.B.5	AM.A.LB.B.3
	AM.D.ID.A.6	AM.N.NQ.B.6	AM.A.LB.B.4
	AM.D.ID.A.7	AM.N.NQ.B.7	AM.D.CI.A.1
	AM. A. PS. A.1	AM.N.NQ.B.8	AM.D.CI.A.2
		AM.N.NQ.C.9	AM.D.CI.A.3
		AM.N.NQ.C.10	AM. A. PS. A.1

[Tennessee Academic Standards for Mathematics](#)



Introduction

Destination 2025, Shelby County Schools' 10-year strategic plan, is designed not only to improve the quality of public education, but also to create a more knowledgeable, productive workforce and ultimately benefit our entire community.

What will success look like?



In order to achieve these ambitious goals, we must collectively work to provide our students with high quality, college and career ready aligned instruction. The Tennessee State Standards provide a common set of expectations for what students will know and be able to do at the end of a grade. The State of Tennessee provides two sets of standards, which include the Standards for Mathematical Content and The Standards for Mathematical Practice. The Content Standards set high expectations for all students to ensure that Tennessee graduates are prepared to meet the rigorous demands of mathematical understanding for college and career. The eight Standards for Mathematical Practice describe the varieties of expertise, habits of mind, and productive dispositions that educators seek to develop in all students. The Tennessee State Standards also represent three fundamental shifts in mathematics instruction: **focus, coherence and rigor**.

Instructional Shifts for Mathematics





Curriculum and Instruction – Mathematics

Quarter 4

Applied Mathematical Concepts

The **Standards for Mathematical Practice** describe varieties of expertise, habits of minds and productive dispositions that mathematics educators at all levels should seek to develop in their students. These practices rest on important National Council of Teachers of Mathematics (NCTM) “processes and proficiencies” with longstanding importance in mathematics education. Throughout the year, students should continue to develop proficiency with the eight Standards for Mathematical Practice. The following are the eight Standards for Mathematical Practice:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of them.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

This curriculum map is designed to help teachers make effective decisions about what mathematical content to teach so that ultimately our students can reach Destination 2025. Throughout this curriculum map, you will see resources as well as links to tasks that will support you in ensuring that students are able to reach the demands of the standards in your classroom. In addition to the resources embedded in the map, there are some high-leverage resources around the content standards and mathematical practice standards that teachers should consistently access. For a full description of each, click on the links below.

[Tennessee Mathematics Content Standards](#)

[Standards for Mathematical Practice](#)

[Literacy Skills for Mathematical Proficiency](#)

[Tennessee Academic Standards for Mathematics](#)



Structure of the Standards

Structure of the TN State Standards include:

- **Content Standards** - Statements of what a student should know, understand, and be able to do.
- **Clusters** - Groups of related standards. Cluster headings may be considered as the big idea(s) that the group of standards they represent are addressing. They are therefore useful as a quick summary of the progression of ideas that the standards in a domain are covering and can help teachers to determine the focus of the standards they are teaching.
- **Domains** - A large category of mathematics that the clusters and their respective content standards delineate and address. For example, Number and Operations – Fractions is a domain under which there are a number of clusters (the big ideas that will be addressed) along with their respective content standards, which give the specifics of what the student should know, understand, and be able to do when working with fractions.
- **Conceptual Categories** – The content standards, clusters, and domains in the 9th-12th grades are further organized under conceptual categories. These are very broad categories of mathematical thought and lend themselves to the organization of high school course work. For example, Algebra is a conceptual category in the high school standards under which are domains such as Seeing Structure in Expressions, Creating Equations, Arithmetic with Polynomials and Rational Expressions, etc.

[Tennessee Academic Standards for Mathematics](#)



How to Use the Maps

Overview

An overview is provided for each quarter and includes the topics, focus standards, intended rigor of the standards and foundational skills needed for success of those standards.

Your curriculum map contains four columns that each highlight specific instructional components. Use the details below as a guide for information included in each column.

Tennessee State Standards

TN State Standards are located in the left column. Each content standard is identified as Major Content or Supporting Content (for Algebra I, Algebra II & Geometry only). A key can be found at the bottom of the map.

Content

This section contains learning objectives based upon the TN State Standards. Best practices tell us that clearly communicating measurable objectives lead to greater student understanding. Additionally, essential questions are provided to guide student exploration and inquiry.

Instructional Support & Resources

District and web-based resources have been provided in the Instructional Support & Resources columns. You will find a variety of instructional resources that align with the content standards. The additional resources provided should be used as needed for content support and scaffolding. The inclusion of vocabulary serves as a resource for teacher planning and for building a common language across K-12 mathematics. One of the goals for Tennessee State Standards is to create a common language, and the expectation is that teachers will embed this language throughout their daily lessons.

[Tennessee Academic Standards for Mathematics](#)



Topics Addressed in Quarter

- Financial Mathematics (continued)
- Logic
- Boolean Algebra

Overview

In this quarter students begin by finishing their study of solving real-world problems involving finance. Students then formally study a small part of the subject of the field of logic- some basic notions that are fundamental in mathematics and law which require clear statements. Students will be introduced to mathematical arguments and develop tools to prove these arguments. Students also examine the notion of conjecture and study conjectures. Lastly students will examine the basic properties of Boolean algebra.

TN STATE STANDARDS	CONTENT	INSTRUCTIONAL SUPPORT & RESOURCES
Financial Mathematics (continued from Quarter 3) (Allow approximately 1-2 weeks for instruction, review, and assessment)		
Continued from Quarter 3 (see standards from quarter 3)	Objective(s): The student will: <ul style="list-style-type: none"> • Solve real-world problems involving the mathematics of finance. 	Continued from Quarter 3 Financial Math Lessons Georgia Virtual Learning (Mathematics of Finance) Foundations U (Activities, Tools, Articles) Comap - A Course in Financial Mathematics (request access at http://www.comap.com/FloydVest/index.html) This is a free course in financial mathematics for upper high school and undergraduate students, with emphasis on personal finance. Financial Math Financial Math Comprehensive Curriculum Units 1- 5 Black Line Masters Financial Math Units 6-10 5 Black Line Masters Financial Math

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Applied Mathematical Concepts

TN STATE STANDARDS	CONTENT	INSTRUCTIONAL SUPPORT & RESOURCES	
Logic & Boolean Algebra (Allow approximately 4-5 weeks for instruction, review, and assessment)			
<p>Domain: Investigate Logic Cluster: Use logic to make arguments and solve problems. AM.G.L.A.1 Define the order of operations for the logical operators. AM.G.L.A.2 Define conjunction, disjunction, negation, conditional, and biconditional. AM.G.L.A.3 Solve a variety of logic puzzles.</p> <p>Domain: Investigate Logic Cluster: Use logic to make arguments and solve problems. AM.G.L.A.4 Construct and use a truth table to draw conclusions about a statement.</p> <p>Domain: Investigate Logic Cluster: Determine the validity of arguments. AM.G.L.B.5 Apply the laws of logic to judge the validity of arguments. AM.G.L.B.6 Give counterexamples to disprove statements. AM.G.L.B.7 Analyze arguments with quantifiers through the use of Venn diagrams. AM.G.L.B.8 Represent logical statements with networks.</p> <p>Domain: Logic and Boolean Algebra Cluster: Use logic and Boolean Algebra in real-world situations. AM.A.LB.A.1 Develop the symbols and properties of Boolean algebra; connect Boolean algebra to</p>	<p>Essential Question(s):</p> <ul style="list-style-type: none"> What is the relationship between a combinational logic design's truth table, logic expression, and circuit implementation? When you simplify a logic expression using Boolean algebra, how do you know that you have the simplest solution and that the solution is correct? <p>Objective(s): The student will:</p> <ul style="list-style-type: none"> Construct truth tables to determine validity of an argument Understand circuits and the laws of Boolean Algebra Solve real-world problems involving logic and Boolean Algebra 	<p>Tennessee Finite Math Textbook (Maki & Thompson) 11-1 Statements, Connectives, and Negation 11-2 Truth Tables 11-3 Equivalence, Implication, and Deduction Math Lab: Investigate Inductive and deductive Reasoning Math Lab: Use counterexamples to disprove Statements</p> <p>Logic & Proof Video: Introduction to Logic Video: Logic Statements Video: Conditional Statements Video: Converse, Inverse, Contrapositive, Biconditional Statements</p> <p>Discrete Math <i>Chapter 3, Symbolic Logic and Proofs</i></p> <p>Mathematical Reasoning: Writing and Proof <i>Section 2.1- Logical Reasoning</i></p> <p>Discrete Mathematics and Its Application 6th Ed. <i>Chapter 1- The Foundations: Logic and Proofs</i> <i>Chapter 11- Boolean Algebra</i></p>	<p>Important Terms & Concepts (TN Finite Math, Chapter 11) Biconditional, conditional, conjunction, counterexample, deduction, disjunction, equivalence, implication, logical connective "and", logical connective "not", logical connective "or", negation, truth table, valid argument</p>



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TN STATE STANDARDS	CONTENT	INSTRUCTIONAL SUPPORT & RESOURCES	
<p>standard logic. AM.A.LB.A.2 Construct truth tables to determine the validity of an argument.</p> <p>Domain: Logic and Boolean Algebra Cluster: Apply Boolean Algebra to real-world network problems. AM.A.LB.B.3 Analyze basic electrical networks; compare the networks to Boolean Algebra configurations. AM.A.LB.B.4 Develop electrical networks and translate them into Boolean Algebra equations.</p>		<p>Additional Resource(s)</p> <p>Logic & Truth Tables Video Part 1 Logic & Truth Tables Video Part 2 Logic & Truth Tables Video Part 3 Logic & Truth Tables Video Part 4 Boolean Algebra Videos Truth Tables and Boolean Algebra Boolean Algebra; The Building Blocks of Digital Logic Design Boolean Algebra 1 Boolean Algebra 2 Boolean Algebra (Chapter 11) Boolean Algebra is Elementary</p>	
<p>Previous Topics</p> <p><i>Use this time to review or for more in-depth coverage of previous topics, specifically applications/real-world problems involving those topics.</i></p> <p><i>(Allow approximately 2-3 weeks for instruction, review, and assessment)</i></p>			
<p>Domain: Problem Solving Cluster: Apply problem solving techniques to real-world situations. AM. A.PS. A.1 Apply problem solving strategies to real-world situations. <i>Strategies include, but are not limited to: making orderly lists or tables, drawing diagrams, considering simpler problems, looking for patterns, working backwards, guess and check, using logical reasoning, etc.</i></p>	<p>See previous content.</p>	<p>Unit I: Analyzing Numerical Data Unit II: Probability Unit III: Statistical Studies Unit VI: Decision Making in Finance</p> <p>Discrete Mathematics and Its Application 6th Ed.</p> <p>TI Statistics Activities TI Finance Activities TI Logic Activities</p>	



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RESOURCE TOOLBOX		
<p>Textbook Resources</p> <p>Advanced Algebra & Trigonometry (Coburn) Algebra & Trigonometry (Blitzer)</p> <p>Elementary Statistics Textbook (Bluman)</p> <p>Stats Modeling the World</p> <p>Tennessee Finite Math (Maki & Thompson) Discrete Math Discrete Mathematics and Its Application 6th Ed.</p>	<p>Standards</p> <p>Common Core Standards - Mathematics</p> <p>Common Core Standards - Mathematics Appendix A http://www.ccsstoolbox.org/</p> <p>Common Core Lessons</p> <p>Tennessee's State Mathematics Standards</p>	<p>Videos</p> <p>Khan Academy</p> <p>Illuminations (NCTM)</p> <p>Discovery Education</p> <p>The Futures Channel</p> <p>The TeachingChannel</p> <p>Teachertube.com</p> <p>FiniteHelp Lecture Videos</p> <p>Against All Odds Videos (with Study Guides) (A Video Series that introduces a statistical topic and illustrates it with a real-world example)</p>
<p>Calculator</p> <p>Texas Instruments Education</p> <p>TI-Nspired http://www.atomiclearning.com/ti_84</p> <p>TICommonCore.com http://www.casioeducation.com/educators</p>	<p>Interactive Manipulatives</p> <p>Stat Trek</p> <p>Rossmanchance.com</p> <hr/> <p>ACT</p> <p>TN ACT Resources</p> <p>ACT College & Career Readiness Mathematics Standards</p>	<p>Additional Sites</p> <p>Georgia Virtual Learning (Mathematics of Finance)</p> <p>NCTM Math Illuminations</p> <p>Wolfram Math World</p> <p>Statistics Education Web</p> <p>SCS Math Tasks: Statistics</p> <p>http://www.edutoolbox.org/tntools (formerly tncore.org)</p> <p>Statistics Teacher</p> <p>(An online journal published by the American Statistical Association – National Council of Teachers of Mathematics Joint Committee on Curriculum in Statistics and Probability for Grades K-12.)</p>

[Tennessee Academic Standards for Mathematics](#)