



Curriculum and Instruction – Mathematics

Quarter 2

Algebra I

Mathematics Algebra I: Year at a Glance 2019 - 2020

Q1		Q2		Q3		Q4	
Module 1 Aug. 12 – Oct. 11		Module 3 Oct. 21 - Dec. 20		Module 4 Jan. 6 – Mar. 13		Modules 2 and 5 Mar. 23 – May 22 TN Ready Testing Apr 13 – May 8	
Module 1 Relationships Between Quantities and Reasoning with Equations and Their Graphs		Module 3 Linear and Exponential Functions		Module 4 Polynomials and Quadratic Expressions, Equations, and Functions		Module 2 Descriptive Statistics Module 5 A Synthesis of Modeling with Equations and Functions	
A1. N.Q.A.1	A1.A.REI. C.4*	A1. A. SSE. B.3	A1. F.IF.C.8*	A1. A. SSE. A.1	A1. F.IF.C.6*	A1. N.Q.A.2	A1. S.ID.A.1
A1. N.Q.A.2	A1.A.REI. D.5*	A1. A. SSE. B.3c*	A1. F.BF.A.1	A1. A. SSE. A.2	A1. F.IF.C.7*	A1. N.Q.A.3	A1. S.ID.A.2
A1. N.Q.A.3	A1.A.REI. D.7*	A1. A. CED.A.1	A1. F.BF.A.1a	A1. A. SSE. B.3	A1. F.IF.C.8*	A1. A. CED.A.1	A1. S.ID.A.3
A1. A. APR.A.1		A1.A.REI. D.6*	A1. F.BF.B.2*	A1. A. APR.A.1	A1. F.BF.B.2*	A1. A. CED.A.2	A1. S.ID.B.4*
A1. A. CED.A.1		A1. F.IF.A.1	A1. F.LE.A.1a	A1. A. APR.B.2*		A1. F.IF.B.3*	A1. S.ID.B.4a*
A1. A. CED.A.2		A1. F.IF.A.2	A1. F.LE.A.2	A1. A. REI.B.3*		A1. F.IF.B.4*	A1. S.ID.B.4b*
A1. A. CED.A.3		A1. F.IF.B.3*	A1. F.LE.A.3	A1. A. CED.A.1		A1. F.IF.B.5*	A1. S.ID.C.5*
A1. A. CED.A.4		A1. F.IF.B.4*	A1. F.LE.B.4*	A1. A. CED.A.2		A1. F.BF.A.1	A1. S.ID.C.6*
A1. A. SSE. A.1		A1. F.IF.B.5*		A1.A.REI. D.6*		A1. F.LE.A.1	A1. S.ID.C.7*
A1. A. SSE. A.2		A1. F.IF.C.6*		A1. F.IF.B.3*		A1. F.LE.A.1b	
A1. A. REI.A.1		A1. F.IF.C.6a*		A1. F.IF.B.4*		A1. F.LE.A.1c	
A1.A.REI.B. 2*		A1. F.IF.C.6b*		A1. F.IF.B.5*		A1. F.LE.A.2	

Key:

Major Content	➤ Supporting Content
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*** (asterisk) Indicates a standard with differences between the TN State Standards' numbering and/or verbiage and the standards in Eureka**

Note: Please use this suggested pacing as a guide. It is understood that teachers may be up to 1 week ahead or 1 week behind depending on the needs of their students.

Use the instructional map and Digital Suite resources as you prepare to teach a module for additional guidance in planning, pacing, and suggestions for omissions.



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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



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.





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. 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

District and web-based resources have been provided in the Instructional Support column. 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.

Vocabulary and Fluency

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. In order to aid your planning, we have also included a list of fluency activities for each lesson. It is expected that fluency practice will be a part of your daily instruction. (Note: Fluency practice is not intended to be speed drills, but rather an intentional sequence to support student automaticity. Conceptual understanding must underpin the work of fluency.)

Instructional Calendar

As a support to teachers and leaders, an instructional calendar is provided **as a guide**. Teachers should use this calendar for effective planning and pacing, and leaders should use this calendar to provide *support* for teachers. Due to variances in class schedules and differentiated support that may be needed for students' adjustment to the calendar may be required.



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Topics Addressed in Quarter

Topic B: Functions and Their Graphs

Topic A: Linear and Exponential Sequences


Topic C: Transformations of Functions

Topic D: Using Functions and Graphs to Solve Problems

Time Frame: October 21 – December 20, 2019

Overview

In earlier grades, students define, evaluate, and compare functions and use them to model relationships between quantities. In quarter two, students extend their study of functions to include function notation and the concepts of domain and range. They explore many examples of functions and their graphs, focusing on the contrast between linear and exponential functions. They interpret functions given graphically, numerically, symbolically, and verbally; translate between representations; and understand the limitations of various representations.

Grade Level Standard	Type of Rigor	Foundational Standards
A1. A. SSE. B.3	Conceptual Understanding & Procedural Fluency	7.EE.A.1, 8EE.A.1
A1. A. SSE. B.3c*	Conceptual Understanding & Procedural Fluency	8.EE.A.1
A1. A. CED.A.1	Conceptual Understanding, Procedural Fluency & Application	7.EE.B.4, 8.EE.C.7
A1.A.REI. D.6*	Conceptual Understanding & Procedural Fluency	8.EE.C.8
A1. F.IF.A.1	Conceptual Understanding	8.F.A.1, 8.F.A.2, 8.F.A.3
A1. F.IF.A.2	Conceptual Understanding & Procedural Fluency	6.EE.A.2c
A1. F.IF.B.3*	Conceptual Understanding	8.F.B.5
A1. F.IF.B.4*	Conceptual Understanding	Introductory
A1. F.IF.B.5*	Conceptual Understanding & Procedural Fluency	8.F.B.4
A1. F.IF.C.6*	Conceptual Understanding & Procedural Fluency	8.EE.B.5, 8.F.A.3
A1. F.IF.C.8*	Conceptual Understanding & Procedural Fluency	Introductory
A1. F.BF.A.1	Conceptual Understanding & Procedural Fluency	8.F.B.4
A1. F.BF.B.2*	Conceptual Understanding & Procedural Fluency	Introductory
A1. F.LE.A.1a	Conceptual Understanding	8.F.A.3
A1. F.LE.A.2	Conceptual Understanding & Procedural Fluency	8.F.B.4
A1. F.LE.A.3	Conceptual Understanding	Introductory
A1. F.LE.B.4*	Conceptual Understanding	Introductory
 Indicates 2017-2018 Power Standard		
Instructional Focus Documents-Algebra I		



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TN STATE STANDARDS	CONTENT	INSTRUCTIONAL SUPPORT	VOCABULARY
<p>Module 3 Linear and Exponential Functions Algebra I Pacing and Preparation Guide <i>Allow approximately 2 weeks for instruction, review and assessment of Topic B</i> <i>Allow approximately 3 weeks for instruction, review and assessment of Topic A</i> Mid-Module 3 Assessment Window – November 21-22 <i>Allow 2 weeks for instruction, review and assessment of Topic C</i> <i>Allow approximately 1 week for instruction, review and assessment of Topic D</i> End-of-Module 3 Assessment Window – December 12- 13</p>			
<p>Domain: Interpreting Functions Cluster: Understand the concept of a function and use function notation.</p> <p>■ A1. F.IF.A.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$.</p> <p>■ A1. F.IF.A.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.</p> <p>Domain: Interpreting Functions Cluster: Interpret functions that arise in applications in terms of the context.</p> <p>■ A1. F.IF.B.3 (formerly F.IF.B.4) For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.</p> <p>■ A1. F.IF.B.4 (formerly F.IF.B.5) Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.</p>	<p>Topic B Objectives:</p> <p>Lesson 8: A1. F.IF.A.2, A1. F.IF.B.4</p> <ul style="list-style-type: none"> Students use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. Students create functions that represent a geometric situation and relate the domain of a function to its graph and to the relationship it describes. <p>Lessons 9: A1. F.IF.A.1, A1. F.IF.A.2, A1. F.IF.B.4</p> <ul style="list-style-type: none"> Students understand that a function from one set (called the domain) to another set (called the range) assigns each element of the domain to exactly one element of the range. Students use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. <p>Lessons 10: A1. F.IF.A.1, A1. F.IF.A.2, A1. F.IF.B.4</p> <ul style="list-style-type: none"> Students understand that a function from one set (called the domain) to another set (called the range) assigns each element of the domain to exactly one element of the range and understand that if f is a function and x is an element of its domain, then $f(x)$ denotes the output of f 	<p>Topic B: Functions and Their Graphs Special Note: <i>It is recommended that teachers access the additional resources below to meet the needs of your students.</i></p> <p>Lesson 8 (omit) Lesson 9: (Arlington Algebra Project: Intro to Functions pg.37) / (eMath U3:L2 Function Notation) Lesson 10: (Arlington Algebra Project: Functions and Relations pg.41) / (eMath U3:L7 Domain & Range of a Function) Lesson 11: Combine w/ lesson 13 (eMath U3:L3 Graphs of Functions) / (eMath U3:L4 Graphical Features & Terminology) Lesson 12 (omit) Lesson 13: Combine w/ lesson 11 (Arlington Algebra Project: Graphing Lines pg.65) Optional: Before Lesson 14, Review material covered in Module 1, Lesson 3: Graphs of Exponential Functions and (eMath U3:L6 Average Rate of Change) Lesson 14: (eMath U6:L8 Linear vs. Exponential)</p> <p>Special Note: <i>It is recommended that teachers assess student gaps and scaffold accordingly using the resources/ tasks/lessons in the Resource Toolbox or those provided under Additional Resources.</i></p> <p><i>Also, assessments other than Mid-Module and End-of-Module assessments should be given based upon the lessons taught and the needs of the students.</i></p>	<p>Vocabulary for Module 3: Average Rate of Change Domain Function Linear Function Piecewise Linear Function Range</p> <p>Familiar Terms and Symbols for Module 3: Algebraic Expression, Coefficient of a Monomial, Constant, Equation, Equivalent Expressions, Equivalent Polynomial Expressions, Factored Expression, Monomial, Number Sentence, Numerical Expression, Numerical Symbol, Polynomial Expression, Simple Expression, Solution, Solution Set, Terms of a Polynomial, Truth Values of a Number Sentence, Variable Symbol</p>



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<p>Domain: Interpreting Functions</p> <p>Cluster: Analyze functions using different representations.</p> <p>➤ A1. F.IF.C.6 (formerly F.IF.C.7) Graph functions expressed symbolically and show key features of the graph, by hand and using technology.</p> <p>a. Graph linear and quadratic functions and show intercepts, maxima, and minima.</p> <p>Domain: Linear, Quadratic, and Exponential Models</p> <p>Cluster: Construct and compare linear, quadratic, and exponential models and solve problems.</p> <p>➤ A1. F.LE.A.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.</p> <p>a. Recognize that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.</p> <p>b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.</p> <p>c. Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another.</p> <p>■ A1. F.LE.A.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.</p> <p>➤ A1. F.LE.A.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.</p>	<p>corresponding to the input x.</p> <ul style="list-style-type: none"> Students use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. <p>Lesson 11: A1. F.IF.A.1, A1. F.IF.A.2, A1. F.IF.B.4, A1. F.IF.C.6</p> <ul style="list-style-type: none"> Students understand set builder notation for the graph of a real-valued function: $\{(x, f(x)) \mid x \in D\}$. Students learn techniques for graphing functions and relate the domain of a function to its graph. <p>Lesson 12: A1. F.IF.A.1, A1. F.IF.B.4, A1. F.IF.C.6</p> <ul style="list-style-type: none"> Students understand the meaning of the graph of $y = f(x)$, namely $\{(x, y) \mid x \in D \text{ and } y = f(x)\}$. Students understand the definitions of when a function is increasing or decreasing. <p>Lesson 13: A1. F.IF.B.3</p> <ul style="list-style-type: none"> Students create tables and graphs of functions and interpret key features including intercepts, increasing and decreasing intervals, and positive and negative intervals. <p>Lesson 14: A1. F.IF.B.3, A1. F.LE.A.1a, A1. F.LE.A.2, A1. F.LE.A.3</p> <ul style="list-style-type: none"> Students compare linear and exponential models by focusing on how the models change over intervals of equal length. Students observe from tables that a function that grows exponentially will eventually exceed a function that grows linearly. 	<p>Topic B: Functions and Their Graphs</p> <p>Special Note: <i>It is recommended that teachers access the additional resources below to meet the needs of your students.</i></p> <p>Lesson 8 (omit)</p> <p>Lesson 9: (Arlington Algebra Project: Intro to Functions pg.37) / (eMath U3:L2 Function Notation)</p> <p>Lesson 10: (Arlington Algebra Project: Functions and Relations pg.41) / (eMath U3:L7 Domain & Range of a Function)</p> <p>Lesson 11: Combine w/ lesson 13 (eMath U3:L3 Graphs of Functions) / (eMath U3:L4 Graphical Features & Terminology)</p> <p>Lesson 12 (omit)</p> <p>Lesson 13: Combine w/ lesson 11 (Arlington Algebra Project: Graphing Lines pg.65)</p> <p>Optional: Before Lesson 14, Review material covered in Module 1, Lesson 3: Graphs of Exponential Functions and (eMath U3:L6 Average Rate of Change)</p> <p>Lesson 14: (eMath U6:L8 Linear vs. Exponential)</p> <p>Special Note: <i>It is recommended that teachers assess student gaps and scaffold accordingly using the resources/ tasks/lessons in the Resource Toolbox or those provided under Additional Resources.</i></p> <p><i>Also, assessments other than Mid-Module and End-of-Module assessments should be given based upon the lessons taught and the needs of the students.</i></p> <p>Additional Resources:</p> <p>Khan Academy Videos: Functions</p> <p>TN Task Arc-Algebra I: Creating and Interpreting Functions:</p> <p>Functions</p> <p>MVP Module 5 Task 1 Getting Ready for a Pool Party</p> <p>MVP Module 5 Task 2 Floating Down the River</p> <p>MVP Module 5 Task 3 Features of Functions</p> <p>MVP Module 5 Task 4 The Water Park</p> <p>MVP Module 5 Task 6 Interpreting Functions</p> <p>MVP Module 5 Task 7 A Water Function</p> <p>MVP Module 5 Task 8 To Function or Not to Function</p> <p>MVP Module 8 Task 9 Match that Function</p> <p>MathBits Algebra I Notebook</p>	<p>Vocabulary for Module 3:</p> <p>Average Rate of Change</p> <p>Domain</p> <p>Function</p> <p>Linear Function</p> <p>Piecewise Linear Function</p> <p>Range</p> <p>Familiar Terms and Symbols for Module 3:</p> <p>Algebraic Expression, Coefficient of a Monomial, Constant, Equation, Equivalent Expressions, Equivalent Polynomial Expressions, Factored Expression, Monomial, Number Sentence, Numerical Expression, Numerical Symbol, Polynomial Expression, Simple Expression, Solution, Solution Set, Terms of a Polynomial, Truth Values of a Number Sentence, Variable Symbol</p>



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<p>Domain: Interpreting Functions Cluster: Understand the concept of a function and use function notation.</p> <p>■ A1. F.IF.A.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$.</p> <p>■ A1. F.IF.A.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.</p> <p>Domain: Interpreting Functions Cluster: Interpret functions that arise in applications in terms of the context.</p> <p>■ A1. F.IF.B.5 (formerly F.IF.B.6) Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.</p> <p>Domain: Building Functions Cluster: Build a function that models a relationship between two quantities.</p> <p>➤ A1. F.BF.A.1 Write a function that describes a relationship between two quantities.</p> <p>a. Determine an explicit expression, a recursive process, or steps for calculation from a context.</p> <p>Domain: Linear, Quadratic, and Exponential</p>	<p>Essential Questions:</p> <ul style="list-style-type: none"> What are the characteristics of exponential functions? What are real world models of exponential growth and decay? How can one differentiate an exponential model from a linear model given a real world set of data? How do I use different representations to analyze linear and exponential functions? How do I build a linear or exponential function that models a relationship between two quantities? Why is the concept of a function important and how do I use function notation to show a variety of situations modeled by functions? How do I interpret functions that arise in applications in terms of context? How can we use real-world situations to construct and compare linear and exponential models and solve problems? <p>Topic A Objectives</p> <p>Lesson 1: A1. F.BF.A.1a, A1. F.IF.A.1, A1. F.IF.A.2</p> <ul style="list-style-type: none"> Students examine sequences and are introduced to the notation used to describe them. <p>Lesson 2: A1. F.BF.A.1a, A1. F.IF.A.1, A1. F.IF.A.2</p> <ul style="list-style-type: none"> Students write sequences with recursive and explicit formulas. 	<p>Topic A: Linear and Exponential Sequences Special Note: <i>It is recommended that teachers access the additional resources below to meet the needs of your students.</i></p> <p>Lesson 1: (eMath U4:L12 Intro to Sequences) Lesson 2 (Introduce students to the sequences and the formulas so that they can be familiar when they move to Lesson 3; this lesson focuses on writing sequences which may be fully taught for enrichment) Lesson 3: (eMath U4:L13 Arithmetic Sequences) / (eMath U6:L9 Geometric Sequences) Lesson 4: (Arlington Algebra Project: Intro to Exponential Growth pg.349) Lesson 5: (eMath U6:L3 Exponential Growth & Decay) Lesson 6: (eMath U6:L7 Exponential Models Based on % Growth) Lesson 7: (eMath U6:L3 Exponential Growth & Decay)</p> <p>Special Note: <i>It is recommended that teachers assess student gaps and scaffold accordingly using the resources/ tasks/lessons in the Resource Toolbox or those provided under Additional Resources.</i></p> <p><i>Also, assessments other than Mid-Module and End-of-Module assessments should be given based upon the lessons taught and the needs of the students.</i></p> <p>Additional Resources: Khan Academy Videos: Arithmetic and Geometric Sequences Khan Academy Videos: Exponential vs Linear Growth Arithmetic and Geometric Sequences MVP Module 3 Task 1 Growing Dots MVP Module 3 Task 2 Growing , Growing Dots Linear & Exponential Functions MVP Module 4 Task 1 Connecting the Dots: Piggies and Pools MVP Module 4 Task 4 Linear, Exponential, or Neither MVP Module 4 Task 5 Getting Down to Business</p>	<p>Vocabulary for Module 3:</p> <p>Average Rate of Change Domain Function Linear Function Piecewise Linear Function Range</p> <p>Familiar Terms and Symbols for Module 3: Algebraic Expression, Coefficient of a Monomial, Constant, Equation, Equivalent Expressions, Equivalent Polynomial Expressions, Factored Expression, Monomial, Number Sentence, Numerical Expression, Numerical Symbol, Polynomial Expression, Simple Expression, Solution, Solution Set, Terms of a Polynomial, Truth Values of a Number Sentence, Variable Symbol</p>



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<p>Models Cluster: Construct and compare linear, quadratic, and exponential models and solve problems.</p> <p>➤ A1.F.LE.A.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.</p> <p>a. Recognize that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.</p> <p>b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.</p> <p>c. Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another.</p> <p>■ A1.F.LE.A.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.</p> <p>➤ A1.F.LE.A.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.</p>	<p>Lesson 3: A1.F.BF.A.1a, A1.F.IF.A.2, A1.F.LE.A.2</p> <ul style="list-style-type: none"> Students learn the structure of arithmetic and geometric sequences. <p>Lesson 4: A1.F.BF.A.1a, A1.F.IF.A.2, A1.F.LE.A.2</p> <ul style="list-style-type: none"> Students compare the rate of change for simple and compound interest and recognize situations in which a quantity grows by a constant percent rate per unit interval. <p>Lesson 5: A1.F.BF.A.1a, A1.F.IF.A.2, A1.F.LE.A.1, A1.F.LE.A.2, A1.F.LE.A.3</p> <ul style="list-style-type: none"> Students are able to model with and solve problems involving exponential formulas. <p>Lesson 6: A1.F.BF.A.1a, A1.F.IF.A.2, A1.F.IF.B.5, A1.F.LE.A.1, A1.F.LE.A.2, A1.F.LE.A.3</p> <ul style="list-style-type: none"> Students compare linear and exponential models of population growth. <p>Lesson 7: A1.F.BF.A.1a, A1.F.IF.A.2, A1.F.LE.A.2</p> <ul style="list-style-type: none"> Students describe and analyze exponential decay models; they recognize that in a formula that models exponential decay, the growth factor b is less than 1; or, equivalently, when b is greater than 1, exponential formulas with negative exponents could also be used to model decay. 	<p>Topic A: Linear and Exponential Sequences Special Note: <i>It is recommended that teachers access the additional resources below to meet the needs of your students.</i></p> <p>Lesson 1: (eMath U4:L12 Intro to Sequences) Lesson 2 (Introduce students to the sequences and the formulas so that they can be familiar when they move to Lesson 3; this lesson focuses on writing sequences which may be fully taught for enrichment) Lesson 3: (eMath U4:L13 Arithmetic Sequences) / (eMath U6:L9 Geometric Sequences) Lesson 4: (Arlington Algebra Project: Intro to Exponential Growth pg.349) Lesson 5: (eMath U6:L3 Exponential Growth & Decay) Lesson 6: (eMath U6:L7 Exponential Models Based on % Growth) Lesson 7: (eMath U6:L3 Exponential Growth & Decay)</p> <p>Special Note: <i>It is recommended that teachers assess student gaps and scaffold accordingly using the resources/ tasks/lessons in the Resource Toolbox or those provided under Additional Resources.</i></p> <p><i>Also, assessments other than Mid-Module and End-of-Module assessments should be given based upon the lessons taught and the needs of the students.</i></p> <p>Additional Resources: Khan Academy Videos: Arithmetic and Geometric Sequences Khan Academy Videos: Exponential vs Linear Growth Arithmetic and Geometric Sequences MVP Module 3 Task 1 Growing Dots MVP Module 3 Task 2 Growing , Growing Dots Linear & Exponential Functions MVP Module 4 Task 1 Connecting the Dots: Piggies and Pools MVP Module 4 Task 4 Linear, Exponential, or Neither MVP Module 4 Task 5 Getting Down to Business</p>	<p>Vocabulary for Module 3: Average Rate of Change Domain Function Linear Function Piecewise Linear Function Range</p> <p>Familiar Terms and Symbols for Module 3: Algebraic Expression, Coefficient of a Monomial, Constant, Equation, Equivalent Expressions, Equivalent Polynomial Expressions, Factored Expression, Monomial, Number Sentence, Numerical Expression, Numerical Symbol, Polynomial Expression, Simple Expression, Solution, Solution Set, Terms of a Polynomial, Truth Values of a Number Sentence, Variable Symbol</p>



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TN STATE STANDARDS	CONTENT	INSTRUCTIONAL SUPPORT	VOCABULARY
		<p>Mid-Module 3 Assessment <i>(Complete by 11/22/19; do not use problems from omitted lessons)</i></p>	
<p>Domain: Reasoning with Equations and Inequalities</p> <p>Cluster: Represent and solve equations and inequalities graphically.</p> <p>■ A1. A. REI.D.6 (formerly A. REI.D.11) Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the approximate solutions using technology.</p> <p>Domain: Interpreting Functions</p> <p>Cluster: Analyze functions using different representations.</p> <p>➤ A1. F.IF.C.6 (formerly F.IF.C.7) Graph functions expressed symbolically and show key features of the graph, by hand and using technology.</p> <p>a. Graph linear and quadratic functions and show intercepts, maxima, and minima.</p> <p>b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value function.</p> <p>Domain: Building Functions</p> <p>Cluster: Build new functions from existing functions.</p> <p>➤ A1. F.BF.B.2 (formerly F.BF.B.3) Identify the effect on the graph of</p>	<p>Topic C Objectives:</p> <p>Lesson 15: A1. F.IF.C.6b</p> <ul style="list-style-type: none"> Students examine the features of piecewise functions including the absolute value function and step functions. Students understand that the graph of a function f is the graph of the equation $y = f(x)$. <p>Lesson 16: A1. A. REI.D.6, A1. F.IF.C.6</p> <ul style="list-style-type: none"> Students discover that the multi-step and exact way of solving $2x - 5 = 3x + 1$ using algebra can sometimes be avoided by recognizing that an equation of the form $f(x) = g(x)$ can be solved visually by looking for the intersection points of the graphs of $y = f(x)$ and $y = g(x)$. <p>Lesson 17: A1. F.BF.B.2, A1. F.IF.C.6b</p> <ul style="list-style-type: none"> Students examine that a vertical translation of the graph of $y = f(x)$ corresponds to changing the equation from $y = f(x)$ to $y = f(x) + k$. Students examine that a vertical scaling of the graph of $y = f(x)$ corresponds to changing the equation from $y = f(x)$ to $y = kf(x)$. <p>Lesson 18: A1. F.BF.B.2, A1. F.IF.C.6b</p> <ul style="list-style-type: none"> Students examine that a horizontal translation of the graph of $y = f(x)$ corresponds to changing the equation from $y = f(x)$ to $y = f(x - k)$. 	<p>Topic C: Transformations of Functions</p> <p>Optional: Before Lesson 15, Review material covered in Module 1, Lesson 1: Graphs of Piecewise Linear Functions</p> <p>Lesson 15 Lesson 16 Lesson 17 (combine with lessons 18 and 19) Lesson 20 (omit)</p> <p>Additional Resource(s): Khan Academy Videos: Absolute Value and Piecewise Functions</p> <p>Special Note: <i>It is recommended that teachers assess student gaps and scaffold accordingly using the resources/ tasks/lessons in the Resource Toolbox or those provided under Additional Resources.</i></p> <p><i>Also, assessments other than Mid-Module and End-of-Module assessments should be given based upon the lessons taught and the needs of the students.</i></p>	<p>Vocabulary for Module 3:</p> <p>Average Rate of Change Domain Function Linear Function Piecewise Linear Function Range</p> <p>Familiar Terms and Symbols for Module 3: Algebraic Expression, Coefficient of a Monomial, Constant, Equation, Equivalent Expressions, Equivalent Polynomial Expressions, Factored Expression, Monomial, Number Sentence, Numerical Expression, Numerical Symbol, Polynomial Expression, Simple Expression, Solution, Solution Set, Terms of a Polynomial, Truth Values of a Number Sentence, Variable Symbol</p>



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Quarter 2

Algebra I

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<p>replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.</p>	<p>Lesson 19: A1. F.BF.B.2, A1. F.IF.C.6a</p> <ul style="list-style-type: none"> Students examine that a horizontal scaling with scale factor k of the graph of $y = f(x)$ corresponds to changing the equation from $y = f(x)$ to $y = f[(1/k)(x)]$. <p>Lesson 20: A1. F.BF.B.2, A1. F.IF.C.6b</p> <ul style="list-style-type: none"> Students apply their understanding of transformations of functions and their graphs to piecewise functions. 		
<p>Domain: Create equations</p> <p>Cluster: Create equations that describe numbers or relationships.</p> <p>■ A1.A.CED.A.1 Create equations and inequalities in one variable and use them to solve problems.</p> <p>Domain: Building Functions</p> <p>Cluster: Build a function that models a relationship between two quantities.</p> <p>➤ A1. F.BF.A.1 Write a function that describes a relationship between two quantities.</p> <p>a. Determine an explicit expression, a recursive process, or steps for calculation from a context</p> <p>Domain: Linear, Quadratic, and Exponential Models</p> <p>Cluster: Construct and compare linear, quadratic, and exponential models and solve problems.</p> <p>■ A1. F.LE.A.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.</p> <p>➤ A1. F.LE.A.3 Observe using graphs and</p>	<p>Topic D Objectives:</p> <p>Lesson 21: A1. F.BF.A.1, A1. F.IF.B.5, A1. F.LE.A.2, A1. F.LE.A.3, A1. F.LE.B.4</p> <ul style="list-style-type: none"> Students create models and understand the differences between linear and exponential models that are represented in different ways. <p>Lesson 22: A1. F.BF.A.1a, A1. F.IF.B.3, A1. F.IF.B.5, A1. F.LE.A.2, A1. F.LE.B.4</p> <ul style="list-style-type: none"> Students apply knowledge of exponential functions and transformations of functions to a contextual situation. <p>Lesson 23: A1.A.SSE.B.3c, A1. F.BF.A.1, A1. F.LE.A.2</p> <ul style="list-style-type: none"> Students apply knowledge of exponential functions and transformations of functions to a contextual situation. <p>Lesson 24: A1. F.BF.A.1</p> <ul style="list-style-type: none"> Students create piecewise and step functions that relate to real-life situations and use those functions to solve problems. Students interpret graphs of piecewise and step functions in a real-life situation. 	<p>Topic D: Using Functions and Graphs to Solve Problems</p> <p>Lesson 21 (optional) Lesson 22 (optional) Lesson 23 (optional) Lesson 24 (optional)</p> <p>Additional Resource(s): MathBits Algebra I Notebook</p> <p>End-of-Module 3 Assessment (Complete by 12/13/19; do not use problems from omitted lessons)</p> <p>Special Note: <i>It is recommended that teachers should begin preparing for next quarter with by attending the Module Study for Module 4 that will be held towards the end of the quarter.</i></p>	<p>Vocabulary for Module 3:</p> <p>Average Rate of Change Domain Function Linear Function Piecewise Linear Function Range</p> <p>Familiar Terms and Symbols for Module 3:</p> <p>Algebraic Expression, Coefficient of a Monomial, Constant, Equation, Equivalent Expressions, Equivalent Polynomial Expressions, Factored Expression, Monomial, Number Sentence, Numerical Expression, Numerical Symbol, Polynomial Expression, Simple Expression, Solution, Solution Set, Terms of a Polynomial, Truth Values of a Number Sentence, Variable Symbol</p>



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Algebra I

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<p>tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.</p> <p>➤ A1. F.LE.B.4 (formerly F.LE.B.5) Interpret the parameters in a linear or exponential function in terms of a context.</p> <p>Domain: Seeing Structure in Expressions Cluster: Write expressions in equivalent forms to solve problems.</p> <p>■ A1.A.SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. c. Use the properties of exponents to rewrite exponential expressions</p> <p>Domain: Interpreting Functions Cluster: Interpret functions that arise in applications in terms of the context.</p> <p>■ A1. F.IF.B.3 (formerly F.IF.B.4) For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. ★</p> <p>■ A1. F.IF.B.4 (formerly F.IF.B.5) Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.</p> <p>■ A1. F.IF.B.5 (formerly F.IF.B.6) Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.</p>			



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Algebra I

RESOURCE TOOLKIT

Standards

[Teacher Guide to Algebra I Standards: Linear Equations](#)
[HS Flip Book with Examples of Each Standard](#)
 CCSS
<http://www.ccsstoolbox.org/>
<http://parconline.org/>
 Achieve
[Tennessee Academic Standards for Mathematics](#)
[Tennessee Assessment LiveBinder](#)
[Achieve the Core Coherence Map](#)

Videos

[Khan Academy](#)
[Illuminations \(NCTM\)](#)
[Discovery Education](#)
[The Futures Channel](#)
[The Teaching Channel](#)
[Teachertube.com](#)
[Get The Math](#)
[eMathInstruction](#)

Calculator

[Texas Instruments Education](#)
 TI-Nspire
http://www.atomiclearning.com/ti_84
[TICCommonCore.com](#)
<http://www.casioeducation.com/educators>

Manipulatives/Other Resources

[MathBits Algebra I Notebook](#)
[Problem Attic](#)
[OpenEd](#)
[National Library of Virtual Manipulatives](#)
<http://www.shodor.org/interactivate/activities/>
[Edugoodies](#)
[Graphic Organizers \(9-12\)](#)

SEL Resources

[SEL Connections with Math Practices](#)
[SEL Core Competencies](#)
[The Collaborative for Academic, Social, and Emotional Learning \(CASEL\)](#)

Tasks/Lessons

[Edutoolbox \(formerly Tncore.org\)](#)
[Mathematics Assessment Project \(MARS Tasks, Lessons & PD Modules\)](#)
[Dan Meyer's Three-Act Math Tasks](#)
[Illustrative Math Tasks](#)
[UT Dana Center](#)
[Inside Math Tasks](#)
[LearnZillion](#)
[eMathInstruction](#)
[Arlington Algebra Project](#)

ACT/SAT Testing

[ACT & SAT](#)
[TN ACT Information & Resources](#)
[ACT College & Career Readiness Mathematics Standards](#)
[SAT Connections](#)
[SAT Practice from Khan Academy](#)



Curriculum and Instruction – Mathematics

Quarter 2

Algebra I

October 2019

Suggested Lessons for the Week	Monday	Tuesday	Wednesday	Thursday	Friday	Notes:
Module 1, Topic C (Lesson 24) Module 1, Topic D (Lessons 25-28; omit Lessons 26 and 27; Lesson 28 is optional)	30	1 Topic C Lesson 24	2 Topic D Lesson 25	3 Topic D Lesson 25	4 Flex Day Options A1.A.CED.A.1 A1.A.REI.D.7 Pacing Other	<p>Please use this suggested pacing as a guide. It is understood that teachers may be up to 1 week ahead or 1 week behind depending on their individual class needs.</p> <p>Flex Day Options Include:</p> <p>Standard- Suggested standard(s) to review for the day (*-denotes a Power Standard)</p> <p>Pacing – Use this time to adjust instruction to stay on pace.</p> <p>Other- This includes assessments, review, re-teaching, etc.</p>
Assessment, Remediation, and/or Further Application	7 Assessment, Remediation, and/or Further Application	8 Assessment, Remediation, and/or Further Application	9 Assessment, Remediation, and/or Further Application	10 End of Module Assessment (do not use problems from omitted lessons)	11 ½ day students End of 1 st Quarter Flex Day Options A1.N.Q.A.1 Pacing Other	
	14	15	16	17	18	
Fall Break						
Module 3, Topic B (Lessons 9 & 10; omit Lesson 8)	21 2 nd Quarter Begins Topic B Lesson 9	22 Topic B Lesson 9	23 Topic B Lesson 10	24 Topic B Lesson 10	25 Flex Day Options A1. F.IF.A.1 A1. F.IF.A.2 Pacing Other	
Module 3, Topic B (Lessons 11-14; omit Lesson 12; combine Lessons 11 & 13)	28 Topic B Lesson 11/13	29 Topic B Lesson 11/13	30 Topic B Lesson 14	31 Topic B Lesson 14 Halloween	1	



Curriculum and Instruction – Mathematics

Quarter 2

Algebra I

November 2019

Suggested Lessons for the Week	Monday	Tuesday	Wednesday	Thursday	Friday	Notes:
					1 Flex Day Options A1. F.IF.B.4 A1. F.IF.C.6 Pacing Other	<i>Please use this suggested pacing as a guide. It is understood that teachers may be up to 1 week ahead or 1 week behind depending on their individual class needs.</i>
Module 3, Topic A (Lessons 1 & 2)	4 Topic A Lesson 1	5 Topic A Lesson 1	6 Topic A Lesson 2	7 Topic A Lesson 2	8 <i>1/2 day students</i> Flex Day Options A1. F.BF.A.1a Pacing Other	
Module 3, Topic A (Lessons 3-5)	11 Veteran's Day (Out)	12 Topic A Lesson 3	13 Topic A Lesson 3	14 Topic A Lesson 4	15 Topic A Lesson 5	Pacing – Use this time to adjust instruction to stay on pace. Other- This includes assessments, review, re-teaching, etc.
Module 3, Topic A (Lessons 5-7)	18 Topic A Lesson 5	29 Topic A Lesson 6	20 Topic A Lesson 7	21 Mid Module Assessment (do not use problems from omitted lessons)	22 Flex Day Options A1. F.LE.A.1 A1. F.LE.A.2 Pacing Other	
	25 PD FLEX DAYS	26	27 Thanksgiving Break	28	29	



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Algebra I

December 2019

Suggested Lessons for the Week	Monday	Tuesday	Wednesday	Thursday	Friday	Notes:	
Module 3, Topic C (Lessons 15-16)	2 Topic C Lesson 15	3 Topic C Lesson 15	4 Topic C Lesson 16	5 Topic C Lesson 16	6 Flex Day Options A1. A. REI.D.6 A1. F.IF.C.6 Pacing Other	<p><i>Please use this suggested pacing as a guide. It is understood that teachers may be up to 1 week ahead or 1 week behind depending on their individual class needs.</i></p> <p>Flex Day Options Include:</p> <p><i>Standard-</i> Suggested standard(s) to review for the day (*-denotes a Power Standard)</p> <p><i>Pacing</i> – Use this time to adjust instruction to stay on pace.</p> <p><i>Other-</i> This includes assessments, review, re-teaching, etc.</p>	
Module 3, Topic C (Lessons 17-19; combine all three lessons; omit Lesson 20)	9 Topic C Lesson 17-19	10 Topic C Lesson 17-19	11 Topic C Lesson 17-19	12 End of Module Assessment (do not use problems from omitted lessons)	13 Flex Day Options A1. F.BF.B.2 A1. F.IF.C.6b Pacing Other		
Assessment, Remediation, and/or Further Application	16 Assessment, Remediation, and/or Further Application	17 <i>Semester Exams</i>	18 <i>Semester Exams</i>	19 <i>Semester Exams</i>	20 <i>½ day students</i> <i>End of 2nd Quarter</i> Flex Day Options A1. F.LE.A.3 Pacing Other		
	23	24	25	26	27		
Winter Break							
	30	31	1	2	3		
Winter Break							