

Florida Liberal Arts Mathematics 1



Program Overview

This program was developed and reviewed by experienced math educators who have both academic and professional backgrounds in mathematics. This ensures: freedom from mathematical errors, grade level appropriateness, freedom from bias, and freedom from unnecessary language complexity.

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PROGRAM OVERVIEW

Contents of Program Overview

Table of Contents for Instructional Units..... *v*
Introduction to the Program 1
Unit Structure 4
Standards Correlations 8

PROGRAM OVERVIEW

Table of Contents for Instructional Units

Unit 1: Units and Reasoning with Equations

Topic A: Units of Measure

Lesson 1.1: Converting Units U1-1

Lesson 1.2: Modeling with Units and Precision in Modeling U1-10

Topic B: Introduction to Equations

Lesson 1.3: Properties of Equality U1-18

Topic C: Creating Equations and Inequalities in One Variable

Lesson 1.4: Creating Linear Equations in One Variable U1-27

Lesson 1.5: Creating Linear Inequalities in One Variable U1-37

Lesson 1.6: Creating Exponential Equations U1-45

Topic D: Solving Equations and Inequalities in One Variable

Lesson 1.7: Solving Linear Equations U1-55

Lesson 1.8: Solving Linear Inequalities U1-63

Lesson 1.9: Solving Exponential Equations U1-71

Topic E: Rearranging Formulas

Lesson 1.10: Rearranging Formulas U1-78

Topic F: Graphing the Set of All Solutions

Lesson 1.11: Graphing the Set of All Solutions U1-87

Station Activities

Set 1: Ratios and Proportions U1-98

Set 2: Solving Inequalities U1-106

Practice A Worksheets U1-112

Unit 2: Linear and Exponential Functions and Systems

Topic A: Introducing Functions

Lesson 2.1: Domain and Range U2-1

Lesson 2.2: Function Notation and Evaluating Functions U2-13

Topic B: Key Features of Linear Functions

Lesson 2.3: Identifying Key Features of Linear and Exponential Graphs U2-23

Lesson 2.4: Average Rate of Change U2-39

Lesson 2.5: Recognizing Average Rate of Change U2-49

Topic C: Creating and Graphing Equations in Two Variables

Lesson 2.6: Creating and Graphing Linear Equations in Two Variables U2-62

Lesson 2.7: Creating and Graphing Exponential Equations U2-76

PROGRAM OVERVIEW

Table of Contents

Topic D: Solving Systems of Linear Equations

Lesson 2.8: Intersecting Graphs U2-87

Lesson 2.9: Solving Systems of Linear Equations by Substitution and Elimination . U2-100

Lesson 2.10: Solving Systems of Linear Equations by Graphing. U2-109

Topic E: Solving Linear Inequalities and Systems of Inequalities in Two Variables

Lesson 2.11: Solving Linear Inequalities in Two Variables U2-120

Lesson 2.12: Solving Systems of Linear Inequalities. U2-132

Station Activities

Set 1: Solving Equations. U2-148

Set 2: Comparing Linear Models U2-154

Set 3: Relations Versus Functions/Domain and Range U2-161

Set 4: Comparing Exponential Models U2-166

Set 5: Interpreting Exponential Functions U2-174

Set 6: Solving Systems by Substitution and Elimination U2-178

Set 7: Solving Systems by Graphing. U2-183

Set 8: Using Systems in Applications. U2-189

Practice A Worksheets U2-197

Unit 3: Numbers and Expressions

Topic A: Interpreting Structure in Expressions

Lesson 3.1: Identifying Terms, Factors, and Coefficients U3-1

Lesson 3.2: Interpreting Complicated Expressions U3-9

Topic B: Operations with Polynomials

Lesson 3.3: Adding and Subtracting Polynomials U3-17

Lesson 3.4: Multiplying Polynomials. U3-25

Station Activity

Set 1: Operations with Polynomials. U3-33

Practice A Worksheets U3-42

Coordinate Planes CP-1

Formulas F-1

Bilingual Glossary G-1

PROGRAM OVERVIEW

Table of Contents

Unit 4: Quadratic Relationships

Topic A: Creating and Solving Quadratic Equations in One Variable

Lesson 4.1: Taking the Square Root of Both Sides	U4-1
Lesson 4.2: Factoring Expressions by the Greatest Common Factor	U4-9
Lesson 4.3: Factoring Expressions with $a = 1$	U4-17
Lesson 4.4: Factoring Expressions with $a > 1$	U4-25
Lesson 4.5: Solving Quadratic Equations by Factoring	U4-33
Lesson 4.6: Completing the Square	U4-41
Lesson 4.7: Applying the Quadratic Formula	U4-49

Topic B: Analyzing Quadratic Functions

Lesson 4.8: Graphing Quadratic Functions	U4-58
Lesson 4.9: Interpreting Various Forms of Quadratic Functions	U4-72

Topic C: Creating Quadratic Equations in Two or More Variables

Lesson 4.10: Creating and Graphing Equations Using Standard Form	U4-85
Lesson 4.11: Creating and Graphing Equations Using the x -intercepts	U4-98
Lesson 4.12: Creating and Graphing Equations Using Vertex Form	U4-114
Lesson 4.13: Rearranging Formulas Involving Quadratics	U4-127

Station Activities

Set 1: Factoring	U4-140
Set 2: Solving Quadratics	U4-144
Set 3: Graphing Quadratic Equations	U4-148
Set 4: Quadratic Transformations in Vertex Form	U4-156

Practice A Worksheets	U4-164
--	--------

Unit 5: Interpreting Categorical and Quantitative Data

Topic A: Working with a Single Measurement Variable

Lesson 5.1: Representing Data Sets	U5-1
Lesson 5.2: Comparing Data Sets	U5-13
Lesson 5.3: Interpreting Data Sets	U5-27

Topic B: The Normal Curve

Lesson 5.4: The Normal Curve	U5-38
--	-------

Station Activities

Set 1: Displaying and Interpreting Data	U5-52
Set 2: Line of Best Fit	U5-61

Practice A Worksheets	U5-67
--	-------

PROGRAM OVERVIEW

Table of Contents

Unit 6: Transformations, Constructions, and Geometric Modeling

Topic A: Introducing Transformations

Lesson 6.1: Defining Terms U6-1

Lesson 6.2: Transformations As Functions U6-10

Lesson 6.3: Applying Lines of Symmetry U6-20

Topic B: Rotations, Reflections, and Translations

Lesson 6.4: Defining Rotations, Reflections, and Translations U6-28

Lesson 6.5: Applying Rotations, Reflections, and Translations U6-37

Topic C: Defining and Applying Similarity

Lesson 6.6: Defining Similarity U6-47

Lesson 6.7: Applying Similarity Using the Angle–Angle (AA) Criterion U6-60

Topic D: Proving Similarity

Lesson 6.8: Proving Triangle Similarity Using Side-Angle-Side (SAS) and
Side-Side-Side (SSS) Similarity U6-73

Lesson 6.9: Working with Ratio Segments U6-85

Lesson 6.10: Proving the Pythagorean Theorem Using Similarity U6-97

Lesson 6.11: Solving Problems Using Similarity and Congruence U6-109

Topic E: Constructing Lines, Segments, and Angles

Lesson 6.12: Copying Segments and Angles U6-125

Lesson 6.13: Bisecting Segments and Angles U6-136

Lesson 6.14: Constructing Perpendicular and Parallel Lines U6-148

Topic F: Constructing Polygons

Lesson 6.15: Constructing Equilateral Triangles Inscribed in Circles U6-159

Lesson 6.16: Constructing Squares Inscribed in Circles U6-171

Lesson 6.17: Constructing Regular Hexagons Inscribed in Circles U6-184

Topic G: Geometric Modeling

Lesson 6.18: Two-Dimensional Cross Sections of Three-Dimensional Objects U6-197

Lesson 6.19: Density U6-207

Lesson 6.20: Design U6-219

Station Activities

Set 1: Rotations and Reflections U6-231

Set 2: Corresponding Parts, Transformations, and Proof U6-240

Set 3: Circumcenter, Incenter, Orthocenter, and Centroid U6-248

Set 4: Similarity and Scale Factor U6-256

Set 5: Geometric Modeling U6-264

Practice A Worksheets U6-268

Coordinate Planes CP-1

Formulas F-1

Bilingual Glossary G-1

PROGRAM OVERVIEW

Introduction to the Program

Introduction

The *Florida Liberal Arts Mathematics 1 Program* is a complete set of materials developed around the Mathematics Florida Standards (MAFS) and the Liberal Arts Mathematics 1 content map. Topics are built around accessible core curricula, ensuring that the *Florida Liberal Arts Mathematics 1 Program* is useful for striving students and diverse classrooms.

This program realizes the benefits of exploratory and investigative learning and employs a variety of instructional models to meet the learning needs of students with a range of abilities.

The *Florida Liberal Arts Mathematics 1 Program* includes components that support problem-based learning, instruct and coach as needed, provide practice, and assess students' skills. Instructional tools and strategies are embedded throughout.

The program includes:

- More than 130 hours of lessons, addressing all the units of Florida Liberal Arts Mathematics 1
- Essential Questions for each instructional topic
- Vocabulary
- Instruction and Guided Practice
- Sets of standards-based Scaffolded Practice and Practice problems
- Problem-based Tasks and Coaching questions
- Step-by-step graphing calculator instructions for the TI-Nspire and the TI-83/84
- Station activities to promote collaborative learning and problem-solving skills
- Aligned open education resources that enhance procedural fluency and conceptual understanding
- Embedded Instructional Strategies to enable access for all students

Purpose of Materials

The *Florida Liberal Arts Mathematics 1 Program* has been organized to coordinate with the Florida Liberal Arts Math 1 content map and specifications from the Mathematics Florida Standards.

Each topic includes activities that offer opportunities for exploration and investigation. These activities incorporate concept and skill development and guided practice, then move on to the application of new skills and concepts in problem-solving situations. Throughout the lessons, problems are contextualized to enhance rigor and relevance.

PROGRAM OVERVIEW

Introduction to the Program

This program includes all the topics addressed in the Florida Liberal Arts Mathematics 1 content map. These include:

- Units and Reasoning with Equations
- Linear and Exponential Functions and Systems
- Numbers and Expressions
- Quadratic Relationships
- Interpreting Categorical and Quantitative Data
- Transformations, Constructions, and Geometric Modeling

The eight Mathematical Practices described in the Mathematics Florida Standards are infused throughout:

- MAFS.K12.MP.1: Make sense of problems and persevere in solving them.
- MAFS.K12.MP.2: Reason abstractly and quantitatively.
- MAFS.K12.MP.3: Construct viable arguments and critique the reasoning of others.
- MAFS.K12.MP.4: Model with mathematics.
- MAFS.K12.MP.5: Use appropriate tools strategically.
- MAFS.K12.MP.6: Attend to precision.
- MAFS.K12.MP.7: Look for and make use of structure.
- MAFS.K12.MP.8: Look for and express regularity in repeated reasoning.

Structure of the Teacher Resource

The Florida *Liberal Arts Mathematics 1 Program* materials are completely reproducible. The Program Overview is the first section. This section helps you to navigate the materials and shows the correlation between the Mathematics Florida Standards and the lessons. The Program Overview also offers a collection of research-based Instructional Strategies along with their literacy connections (English Language Development (ELD) Standards and WIDA English Language Development Standards) and implementation suggestions.

The remaining materials focus on building math content knowledge and conceptual understanding through application of the units in the Florida Liberal Arts Mathematics 1 curriculum: Units and Reasoning with Equations; Linear and Exponential Functions and Systems; Numbers and Expressions; Quadratic Relationships; Interpreting Categorical and Quantitative Data; and Transformations, Constructions, and Geometric Modeling. The units in the *Florida Liberal Arts Mathematics 1 Program* are designed to be flexible so that you can mix and match activities as the needs of your students and your instructional style dictate.

PROGRAM OVERVIEW

Introduction to the Program

The Station Activities correspond to the content in the units and provide students with the opportunity to apply concepts and skills, while you have a chance to circulate, observe, speak to individuals and small groups, and informally assess and plan.

Each topic includes a pre-assessment and ends with a progress assessment. These allow you to assess students' progress as you move from topic to topic, enabling you to gauge how well students have understood the material and to differentiate as appropriate.

Glossary

The bilingual glossary at the end of each workbook contains vocabulary terms and formulas from throughout the workbook, organized alphabetically. Each listing provides the term and the definition in both English and Spanish.

PROGRAM OVERVIEW

Unit Structure

All of the instructional units have common features. Each topic begins with an overview, listing relevant Essential Questions, vocabulary (titled “Words to Know”), and recommended websites to be used as additional resources, along with a pre-assessment.

Each lesson begins with a list of identified prerequisite skills that students need to have mastered in order to be successful with the new material in the upcoming lesson. This is followed by an introduction, key concepts, common errors/misconceptions, scaffolded practice problems, guided practice examples, a problem-based task with coaching questions and sample responses, a closure activity, and practice worksheets with answer keys. Each topic ends with a progress assessment to evaluate students’ learning.

All of the components are described below and on the following pages for your reference.

Conceptual Activities

Conceptual understanding serves as the foundation on which to build deeper understanding of mathematics. In an effort to build conceptual understanding of mathematical ideas and to provide more than procedural fluency and application, links to interactive open education and Desmos resources are included. (*Note:* These website links will be monitored and repaired or replaced as necessary.) These and many other open educational resources (OERs) are also accessible through the Learning Object Repository as separate objects that can be assigned to students.

Pre-Assessment and Answer Key

This can be used to gauge students’ prior knowledge and to inform instructional planning. The assessment is followed by an answer key. The pre-assessment is provided in both PDF format and as a Learnosity assessment.

Instructional Strategies

These research-based strategies are intended to provide additional support for teachers using Walch’s resources. Implementation guides for these instructional strategies can be found in the program overview, while icons are located throughout the instructional resources to indicate appropriate strategies at the point of use. Inclusion of these strategies along with additional resources for English as a Second Language (ESL) students, SWD students, and struggling readers will provide teachers with a wide range of instructional support.

Essential Questions

These are intended to guide students’ thinking as they proceed through the topic. By the end of each topic, students should be able to respond to the questions.

PROGRAM OVERVIEW

Unit Structure

Words to Know

Vocabulary terms and formulas are provided as background information for instruction or to review key concepts that are addressed in the topic.

Recommended Resources

This is a list of websites that can be used as additional resources. Some websites are games; others provide additional examples and/or explanations. (*Note:* Links will be monitored and repaired or replaced as necessary.) Each site listed in this section is also accessible through the Learning Object Repository as a separate learning object that can be assigned to students.

Warm-Up

Each warm-up takes approximately 5 minutes and addresses either prerequisite and critical-thinking skills or previously taught math concepts.

Warm-Up Debrief

Each debrief provides the answers to the warm-up questions, and offers suggestions for situations in which students might have difficulties. A section titled Connection to the Lesson is also included in the debrief to help answer students' questions about the relevance of the particular warm-up activity to the upcoming instruction. Warm-Ups with debriefs are also provided in PowerPoint presentations.

Identified Prerequisite Skills

This list cites the skills necessary to be successful with the new material.

Introduction

This brief section gives a description of the concepts about to be presented and often contains some Words to Know.

Key Concepts

Provided in bulleted form, this instruction highlights the important ideas and/or processes for meeting the standard(s).

Graphing Calculator Directions

Step-by-step instructions for using a TI-Nspire and a TI-83/84 are provided whenever graphing calculators are referenced.

PROGRAM OVERVIEW

Unit Structure

Common Errors/Misconceptions

This is a list of the common errors students make when applying Key Concepts. This list suggests what to watch for when students arrive at an incorrect answer or are struggling with solving the problems.

Scaffolded Practice (Printable Practice)

This set of 10 printable practice problems provides introductory level skill practice for the lesson. This practice set can be used during instruction time.

Guided Practice

This section provides step-by-step examples of applying the Key Concepts. The three to five examples are intended to aid during initial instruction, but are also for individuals needing additional instruction and/or for use during review and test preparation.

Enhanced Instructional PowerPoint (Presentation)

Each lesson includes an instructional PowerPoint presentation with the following components: Warm-Up, Key Concepts, and Guided Practice. Selected Guided Practice examples include GeoGebra applets. These instructional PowerPoints are downloadable and editable.

Problem-Based Task

This activity can serve as the centerpiece of a problem-based lesson, or it can be used to walk students through the application of the standard, prior to traditional instruction or at the end of instruction. The task makes use of critical-thinking skills.

Optional Problem-Based Task Coaching Questions with Sample Responses

These questions scaffold the task and guide students to solving the problem(s) presented in the task. They should be used at the discretion of the teacher for students requiring additional support. The Coaching Questions are followed by answers and suggested appropriate responses to the coaching questions. In some cases answers may vary, but a sample answer is given for each question.

Recommended Closure Activity

Students are given the opportunity to synthesize and reflect on the lesson through a journal entry or discussion of one or more of the Essential Questions.

Problem-Based Task Implementation Guide

This instructional overview, found with selected Problem-Based Tasks in each unit, highlights connections between the task and the lesson's key concepts and SMPs. The Implementation Guide also offers suggestions for facilitating and monitoring, and provides alternative solutions.

PROGRAM OVERVIEW

Unit Structure

Printable Practice (Sets A and B) and Interactive Practice (Set A)

Each lesson includes two sets of practice problems to support students' achievement of the learning objectives. They can be used in any combination of teacher-led instruction, cooperative learning, or independent application of knowledge. *Note:* Each Practice A is available as an interactive Learnosity activity with Technology-Enhanced Items. For this reason, the printed Practice A worksheets have been moved to the end of their respective units in the printed Student Workbooks.

Progress Assessment and Answer Key

Each topic ends with 10 multiple-choice questions, as well as one extended-response question that incorporates critical thinking and writing components. This can be used to document the extent to which students grasp the concepts and skills addressed during instruction. The progress assessment is provided in both PDF and Learnosity formats.

Unit Assessment and Answer Key

Each unit ends with 12 multiple-choice questions and three extended-response questions that incorporate critical thinking and writing components. This can be used to document the extent to which students grasped the concepts and skills of each unit. Unit assessments are provided as both PDFs and Learnosity assessments.

Station Activities

Each unit includes a collection of station-based activities to provide students with opportunities to practice, reinforce, and apply mathematical skills and concepts. The debriefing discussions after each set of activities provide an important opportunity to help students reflect on their experiences and synthesize their thinking.

PROGRAM OVERVIEW

Standards Correlations

Each topic in this *Florida Liberal Arts Mathematics 1 Program* was written specifically to address the Mathematics Florida Standards (MAFS). Each topic lists the standards covered in all the lessons, and each lesson lists the standards addressed in that particular lesson. In this section, you'll find a comprehensive list mapping the lessons to the MAFS.

Guide to Standards Annotation

As you use this program, you will come across a symbol included with the standards for some of the lessons and activities. This symbol is explained below.

Symbol: ★

Denotes: Modeling Standards

Modeling is best interpreted not as a collection of isolated topics but rather in relation to other standards. Making mathematical models is a Standard for Mathematical Practice. Specific modeling standards appear throughout the high school standards are indicated by a star symbol (★).

From: http://www.cpalms.org/Standards/mafs_modeling_standards.aspx

Correlation to Florida Access Points for Students with Significant Cognitive Disabilities

In the digital version of these Standards Correlations, selected MAFS are linked to scaffolded instructional materials designed to help you introduce grade-level content to students with cognitive disabilities. More information on the Florida Access Points can be found on CPALMS:

http://www.cpalms.org/support/Access_Points_for_Students_with_Significant_Cognitive_Disabilities_Overview.aspx

PROGRAM OVERVIEW

Standards Correlations

Unit 1: Units and Reasoning with Equations			
Topic	Lesson number	Title	Standard(s)
Topic A	Units of Measure		
	1.1	Converting Units	MAFS.912.N-Q.1.1★ MAFS.912.N-Q.1.2★
	1.2	Modeling with Units and Precision in Modeling	MAFS.912.N-Q.1.2★ MAFS.912.N-Q.1.3★
Topic B	Introduction to Equations		
	1.3	Properties of Equality	MAFS.912.A-REI.1.1
Topic C	Creating Equations and Inequalities in One Variable		
	1.4	Creating Linear Equations in One Variable	MAFS.912.A-CED.1.1★ MAFS.912.N-Q.1.2★ MAFS.912.N-Q.1.3★
	1.5	Creating Linear Inequalities in One Variable	MAFS.912.A-CED.1.1★
	1.6	Creating Exponential Equations	MAFS.912.A-CED.1.1★
Topic D	Solving Equations and Inequalities in One Variable		
	1.7	Solving Linear Equations	MAFS.912.A-REI.2.3
	1.8	Solving Linear Inequalities	MAFS.912.A-REI.2.3
	1.9	Solving Exponential Equations	MAFS.912.A-REI.1.1 MAFS.912.A-REI.2.3
Topic E	Rearranging Formulas		
	1.10	Rearranging Formulas	MAFS.912.A-CED.1.4★
Topic F	Graphing the Set of All Solutions		
	1.11	Graphing the Set of All Solutions	MAFS.912.A-REI.4.10

PROGRAM OVERVIEW

Standards Correlations

Unit 2: Linear and Exponential Functions and Systems			
Topic	Lesson number	Title	Standard(s)
Topic A	Introducing Functions		
	2.1	Domain and Range	MAFS.912.F-IF.1.1
	2.2	Function Notation and Evaluating Functions	MAFS.912.F-IF.1.2
Topic B	Key Features of Linear Functions		
	2.3	Identifying Key Features of Linear and Exponential Graphs	MAFS.912.F-IF.2.4★ MAFS.912.F-IF.2.5★
	2.4	Average Rate of Change	MAFS.912.F-IF.2.6★ MAFS.912.F-LE.1.1a★
	2.5	Recognizing Average Rate of Change	MAFS.912.F-IF.2.6★ MAFS.912.F-LE.1.1b★ MAFS.912.F-LE.1.1c★
Topic C	Creating and Graphing Equations in Two Variables		
	2.6	Creating and Graphing Linear Equations in Two Variables	MAFS.912.A-CED.1.2★ MAFS.912.N-Q.1.1★
	2.7	Creating and Graphing Exponential Equations	MAFS.912.A-CED.1.2★ MAFS.912.N-Q.1.1★
Topic D	Solving Systems of Linear Equations		
	2.8	Intersecting Graphs	MAFS.912.A-REI.4.11★
	2.9	Solving Systems of Linear Equations by Substitution and Elimination	MAFS.912.A-REI.3.5 MAFS.912.A-REI.3.6
	2.10	Solving Systems of Linear Equations by Graphing	MAFS.912.A-REI.3.6
Topic E	Solving Linear Inequalities and Systems of Inequalities in Two Variables		
	2.11	Solving Linear Inequalities in Two Variables	MAFS.912.A-REI.4.12
	2.12	Solving Systems of Linear Inequalities	MAFS.912.A-REI.4.12

PROGRAM OVERVIEW

Standards Correlations

Unit 3: Numbers and Expressions			
Topic	Lesson number	Title	Standard(s)
Topic B	Interpreting Structure in Expressions		
	3.1	Identifying Terms, Factors, and Coefficients	MAFS.912.A–SSE.1.1a★
	3.2	Interpreting Complicated Expressions	MAFS.912.A–SSE.1.1b★
Topic C	Operations with Polynomials		
	3.3	Adding and Subtracting Polynomials	MAFS.912.A–APR.1.1
	3.4	Multiplying Polynomials	MAFS.912.A–APR.1.1

Unit 4: Quadratic Relationships			
Topic	Lesson number	Title	Standard(s)
Topic A	Creating and Solving Quadratic Equations in One Variable		
	4.1	Taking the Square Root of Both Sides	MAFS.912.A–CED.1.1★ MAFS.912.A–REI.2.4b
	4.2	Factoring Expressions by the Greatest Common Factor	MAFS.912.A–SSE.1.2
	4.3	Factoring Expressions with $a = 1$	MAFS.912.A–SSE.1.2
	4.4	Factoring Expressions with $a > 1$	MAFS.912.A–SSE.1.2
	4.5	Solving Quadratic Equations by Factoring	MAFS.912.A–SSE.1.2 MAFS.912.A–CED.1.1★ MAFS.912.A–REI.2.4b
	4.6	Completing the Square	MAFS.912.A–SSE.1.2 MAFS.912.A–CED.1.1★ MAFS.912.A–REI.2.4a MAFS.912.A–REI.2.4b
	4.7	Applying the Quadratic Formula	MAFS.912.A–CED.1.1★ MAFS.912.A–REI.2.4a MAFS.912.A–REI.2.4b
Topic B	Analyzing Quadratic Functions		
	4.8	Graphing Quadratic Functions	MAFS.912.F–IF.3.7a★
	4.9	Interpreting Various Forms of Quadratic Functions	MAFS.912.F–IF.3.7a★ MAFS.912.F–IF.3.8a

PROGRAM OVERVIEW

Standards Correlations

Topic	Lesson number	Title	Standard(s)
Topic C	Creating Quadratic Equations in Two or More Variables		
	4.10	Creating and Graphing Equations Using Standard Form	MAFS.912.A–CED.1.2* MAFS.912.A–SSE.2.3a*
	4.11	Creating and Graphing Equations Using the x -intercepts	MAFS.912.A–CED.1.2* MAFS.912.A–SSE.2.3a*
	4.12	Creating and Graphing Equations Using Vertex Form	MAFS.912.A–CED.1.2* MAFS.912.A–SSE.2.3b*
	4.13	Rearranging Formulas Involving Quadratics	MAFS.912.A–CED.1.4*

Unit 5: Interpreting Categorical and Quantitative Data

Topic	Lesson number	Title	Standard(s)
Topic A	Working with a Single Measurement Variable		
	5.1	Representing Data Sets	MAFS.912.S–ID.1.1*
	5.2	Comparing Data Sets	MAFS.912.S–ID.1.2*
	5.3	Interpreting Data Sets	MAFS.912.S–ID.1.3*
Topic B	The Normal Curve		
	5.4	The Normal Curve	MAFS.912.S–ID.1.4*

Unit 6: Transformations, Constructions, and Geometric Modeling

Topic	Lesson number	Title	Standard(s)
Topic A	Introducing Transformations		
	6.1	Defining Terms	MAFS.912.G–CO.1.1
	6.2	Transformations as Functions	MAFS.912.G–CO.1.2
	6.3	Applying Lines of Symmetry	MAFS.912.G–CO.1.3
Topic B	Rotations, Reflections, and Translations		
	6.4	Defining Rotations, Reflections, and Translations	MAFS.912.G–CO.1.4
	6.5	Applying Rotations, Reflections, and Translations	MAFS.912.G–CO.1.5

PROGRAM OVERVIEW

Standards Correlations

Topic	Lesson number	Title	Standard(s)
Topic C	Defining and Applying Similarity		
	6.6	Defining Similarity	MAFS.912.G–SRT.1.2
	6.7	Applying Similarity Using the Angle-Angle (AA) Criterion	MAFS.912.G–SRT.1.3
Topic D	Proving Similarity		
	6.8	Proving Triangle Similarity Using Side-Angle-Side (SAS) and Side-Side-Side (SSS) Similarity	MAFS.912.G–SRT.2.4
	6.9	Working with Ratio Segments	MAFS.912.G–SRT.2.4
	6.10	Proving the Pythagorean Theorem Using Similarity	MAFS.912.G–SRT.2.4
	6.11	Solving Problems Using Similarity and Congruence	MAFS.912.G–SRT.2.5
Topic E	Constructing Lines, Segments, and Angles		
	6.12	Copying Segments and Angles	MAFS.912.G–CO.4.12
	6.13	Bisecting Segments and Angles	MAFS.912.G–CO.4.12
	6.14	Constructing Perpendicular and Parallel Lines	MAFS.912.G–CO.4.12
Topic F	Constructing Polygons		
	6.15	Constructing Equilateral Triangles Inscribed in Circles	MAFS.912.G–CO.4.13
	6.16	Constructing Squares Inscribed in Circles	MAFS.912.G–CO.4.13
	6.17	Constructing Regular Hexagons Inscribed in Circles	MAFS.912.G–CO.4.13
Topic G	Geometric Modeling		
	6.18	Two-Dimensional Cross Sections of Three-Dimensional Objects	MAFS.912.G–GMD.2.4 MAFS.912.G–MG.1.1★
	6.19	Density	MAFS.912.G–MG.1.2★
	6.20	Design	MAFS.912.G–MG.1.3★