

## PROGRAM OVERVIEW

# Standards Correlations

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Each lesson in this *Integrated Pathway: Mathematics III* program was written specifically to address the Common Core State Standards. Each lesson lists the standards covered in all the sub-lessons, and each sub-lesson lists the standards addressed in that particular section. In this section, you'll find a comprehensive list mapping the sub-lessons to the CCSS.

## Guide to Common Core State Standards Annotation

As you use this program, you will come across a symbol included with the Common Core standards for some of the lessons and activities. These symbols are 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, and specific modeling standards appear throughout the high school standards indicated by a star symbol (★).

From <http://www.walch.com/CCSS/00003>

### **Symbol: (+)**

#### **Denotes: College and Career Readiness Standards**

Advanced mathematics standards that are required in higher-level courses such as advanced statistics may also be included in lower-level courses. These additional standards are denoted by (+). According to the Common Core State Standards Initiative, “the evidence concerning college and career readiness shows clearly that the knowledge, skills, and practices important for readiness include a great deal of mathematics prior to the boundary defined by (+) symbols in these standards. Indeed, some of the highest priority content for college and career readiness comes from Grades 6–8.”

From <http://www.walch.com/CCSS/00004>

## **Connections to Future Courses**

This section provides a map between topics introduced in each unit of this course and subsequent courses where each topic is revisited and built upon.

# PROGRAM OVERVIEW

## Standards Correlations

### CCSS INTEGRATED PATHWAY: MATHEMATICS III STANDARDS CORRELATIONS

#### Unit 1: Inferences and Conclusions from Data

Lesson	Sub-lesson number	Title	Standard(s)
<b>Lesson 1</b>	<b>Using the Normal Curve</b>		
	1.1.1	Normal Distributions and the 68–95–99.7 Rule	S-ID.4*
	1.1.2	Standard Normal Calculations	S-ID.4*
	1.1.3	Assessing Normality	S-ID.4*
<b>Lesson 2</b>	<b>Populations Versus Random Samples and Random Sampling</b>		
	1.2.1	Differences Between Populations and Samples	S-IC.1*
	1.2.2	Simple Random Sampling	S-IC.2*
	1.2.3	Other Methods of Random Sampling	S-IC.2*
<b>Lesson 3</b>	<b>Surveys, Experiments, and Observational Studies</b>		
	1.3.1	Identifying Surveys, Experiments, and Observational Studies	S-IC.3*
	1.3.2	Designing Surveys, Experiments, and Observational Studies	S-IC.3*
<b>Lesson 4</b>	<b>Estimating Sample Proportions and Sample Means</b>		
	1.4.1	Estimating Sample Proportions	S-IC.4*
	1.4.2	The Binomial Distribution	S-IC.4*
	1.4.3	Estimating Sample Means	S-IC.4*
	1.4.4	Estimating with Confidence	S-IC.4*
<b>Lesson 5</b>	<b>Comparing Treatments and Reading Reports</b>		
	1.5.1	Evaluating Treatments	S-IC.5*
	1.5.2	Designing and Simulating Treatments	S-IC.5*
<b>Lesson 6</b>	1.5.3	Reading Reports	S-IC.6*
	<b>Making and Analyzing Decisions</b>		
	1.6.1	Making Decisions	S-MD.6*(+)
	1.6.2	Analyzing Decisions	S-MD.7*(+)

# PROGRAM OVERVIEW

## Standards Correlations

### CCSS INTEGRATED PATHWAY: MATHEMATICS III STANDARDS CORRELATIONS

#### Unit 2A: Polynomial Relationships

Lesson	Sub-lesson number	Title	Standard(s)
<b>Lesson 1</b>	<b>Polynomial Structures and Operating with Polynomials</b>		
	2A.1.1	Structures of Expressions	A-SSE.1a★
	2A.1.2	Adding and Subtracting Polynomials	A-APR.1
	2A.1.3	Multiplying Polynomials	A-APR.1
<b>Lesson 2</b>	<b>Proving Identities</b>		
	2A.2.1	Polynomial Identities	A-SSE.1b★ A-SSE.2 A-APR.4
	2A.2.2	Complex Polynomial Identities	N-CN.8 (+) A-SSE.1b★ A-SSE.2 A-APR.4
	2A.2.3	The Binomial Theorem	A-SSE.1a★ A-SSE.1b★ A-SSE.2 A-APR.4 A-APR.5 (+)
<b>Lesson 3</b>	<b>Graphing Polynomial Functions</b>		
	2A.3.1	Describing End Behavior and Turns	F-IF.7c★
	2A.3.2	The Remainder Theorem	A-APR.2
	2A.3.3	Finding Zeros	A-APR.3 N-CN.9 (+) F-IF.7c★
	2A.3.4	The Rational Root Theorem	A-APR.3

# PROGRAM OVERVIEW

## Standards Correlations

Lesson	Sub-lesson number	Title	Standard(s)
Lesson 4	<b>Solving Systems of Equations with Polynomials</b>		
	2A.4.1	Solving Systems of Equations Graphically	A-REI.11★
Lesson 5	<b>Geometric Series</b>		
	2A.5.1	Geometric Sequences	A-SSE.4★
	2A.5.2	Sum of a Finite Geometric Series	A-SSE.4★
	2A.5.3	Sum of an Infinite Geometric Series	A-SSE.4★

### CCSS INTEGRATED PATHWAY: MATHEMATICS III STANDARDS CORRELATIONS

#### Unit 2B: Rational and Radical Relationships

Lesson	Sub-lesson number	Title	Standard(s)
Lesson 1	<b>Operating with Rational Expressions</b>		
	2B.1.1	Structures of Rational Expressions	A-SSE.1a★ A-SSE.1b★ A-SSE.2
	2B.1.2	Adding and Subtracting Rational Expressions	A-APR.7 (+) A-SSE.2
	2B.1.3	Multiplying Rational Expressions	A-APR.7 (+) A-SSE.2
Lesson 2	2B.1.4	Dividing Rational Expressions	A-APR.6 A-APR.7 (+) A-SSE.2
	<b>Solving Rational and Radical Equations</b>		
	2B.2.1	Solving Rational Equations	A-REI.2
	2B.2.2	Solving Radical Equations	A-REI.2
	2B.2.3	Solving Systems of Equations	A-REI.11★

# PROGRAM OVERVIEW

## Standards Correlations

### CCSS INTEGRATED PATHWAY: MATHEMATICS III STANDARDS CORRELATIONS

#### Unit 3: Trigonometry of General Triangles and Trigonometric Functions

Lesson	Sub-lesson number	Title	Standard(s)
<b>Lesson 1</b>	<b>Radians and the Unit Circle</b>		
	3.1.1	Radians	F-TF.1 F-TF.2
	3.1.2	The Unit Circle	F-TF.2
	3.1.3	Special Angles in the Unit Circle	F-TF.2
	3.1.4	Evaluating Trigonometric Functions	F-TF.2
<b>Lesson 2</b>	<b>Trigonometry of General Angles</b>		
	3.2.1	Proving the Law of Sines	G-SRT.9 (+) G-SRT.10 (+)
	3.2.2	Proving the Law of Cosines	G-SRT.10 (+)
	3.2.3	Applying the Laws of Sines and Cosines	G-SRT.11 (+)
<b>Lesson 3</b>	<b>Graphs of Trigonometric Functions</b>		
	3.3.1	Periodic Phenomena and Amplitude, Frequency, and Midline	F-TF.5★
	3.3.2	Using Trigonometric Functions to Model Periodic Phenomena	F-TF.5★

# PROGRAM OVERVIEW

## Standards Correlations

### CCSS INTEGRATED PATHWAY: MATHEMATICS III STANDARDS CORRELATIONS

#### Unit 4A: Mathematical Modeling of Inverse, Logarithmic, and Trigonometric Functions

Lesson	Sub-lesson number	Title	Standard(s)
<b>Lesson 1</b>	<b>Inverses of Functions</b>		
	4A.1.1	Determining Inverses of Quadratic Functions	F–BF.4a
	4A.1.2	Determining Inverses of Other Functions	F–BF.4a
<b>Lesson 2</b>	<b>Modeling Logarithmic Functions</b>		
	4A.2.1	Logarithmic Functions as Inverses	F–BF.4a F–LE.4★
	4A.2.2	Common Logarithms	F–IF.8 F–LE.4★
	4A.2.3	Natural Logarithms	F–IF.8 F–LE.4★
	4A.2.4	Graphing Logarithmic Functions	F–IF.7e★
	4A.2.5	Interpreting Logarithmic Models	F–IF.4★ F–IF.5★ F–IF.6★
<b>Lesson 3</b>	<b>Modeling Trigonometric Functions</b>		
	4A.3.1	Graphing the Sine Function	F–IF.7e★
	4A.3.2	Graphing the Cosine Function	F–IF.7e★

# PROGRAM OVERVIEW

## Standards Correlations

### CCSS INTEGRATED PATHWAY: MATHEMATICS III STANDARDS CORRELATIONS

#### Unit 4B: Mathematical Modeling and Choosing a Model

Lesson	Sub-lesson number	Title	Standard(s)
<b>Lesson 1</b>	<b>Creating Equations</b>		
	4B.1.1	Creating Equations in One Variable	A-CED.1★
	4B.1.2	Representing and Interpreting Constraints	A-CED.3★
	4B.1.3	Rearranging Formulas	A-CED.4★
<b>Lesson 2</b>	<b>Transforming a Model and Combining Functions</b>		
	4B.2.1	Transformations of Parent Graphs	F-BF.3
	4B.2.2	Recognizing Odd and Even Functions	F-BF.3
	4B.2.3	Combining Functions	F-BF.1b★
<b>Lesson 3</b>	<b>Comparing Properties Within and Between Functions</b>		
	4B.3.1	Reading and Identifying Key Features of Real-World Situation Graphs	F-IF.4★ F-IF.5★ F-IF.6★
	4B.3.2	Calculating Average Rates of Change	F-IF.6★
	4B.3.3	Comparing Functions	F-IF.6★ F-IF.9

# PROGRAM OVERVIEW

## Standards Correlations

Lesson	Sub-lesson number	Title	Standard(s)
Lesson 4	<b>Choosing a Model</b>		
	4B.4.1	Linear, Exponential, and Quadratic Functions	A-CED.2★ F-IF.4★ F-IF.5★ F-BF.3
	4B.4.2	Piecewise, Step, and Absolute Value Functions	F-IF.4★ F-IF.5★ F-IF.7b★ F-BF.3
	4B.4.3	Square Root and Cube Root Functions	F-IF.4★ F-IF.5★ F-IF.7b★ F-BF.3
Lesson 5	<b>Geometric Modeling</b>		
	4B.5.1	Two-Dimensional Cross Sections of Three-Dimensional Objects	G-GMD.4 G-MG.1★
	4B.5.2	Density	G-MG.2★
	4B.5.3	Design	G-MG.3★

# PROGRAM OVERVIEW

## Connections to Future Courses

### TOPICS FROM FUTURE COURSES: CCSS INTEGRATED PATHWAY MATHEMATICS III

Math III	Topic introduced	Course/unit where addressed	How addressed
<b>Unit 1</b>	Methods of gathering data for statistical analysis; making and analyzing decisions and making inferences about sample means and proportions; normal and approximately normal distributions	AP Statistics or Math IV	calculating the expected value of distributions other than normal and approximately normal distributions is applied to making inferences and decisions, including decision-making based on payoffs calculated from expected value
<b>Unit 2A</b>	Interpreting structures of higher-order polynomial expressions; systems of equations, including linear-polynomial, polynomial-polynomial, and absolute value-polynomial systems; sequences as infinite and finite series	Precalculus, Calculus, or Math IV	extended to systems of equations, including larger, more complex systems (e.g., $3 \times 3$ and larger systems) using matrices
<b>Unit 2B</b>	Rational expressions; solving rational and radical equations; linear-rational and linear-radical systems	Precalculus, Calculus, or Math IV	solving systems that can be extended to larger, more complex systems (e.g., $3 \times 3$ and larger) using vectors and matrices; graphing more complex rational functions and exploring features of the graphs
<b>Unit 3</b>	Calculating the sine, cosine, and tangent for any triangle using the laws of sines and cosines; trigonometric ratios, including angles measured in radians; the unit circle	Precalculus, Calculus, or Math IV	representing and operating with vectors using trigonometric ratios, trigonometric functions, and complex numbers; evaluating special angles in right triangles using the unit circle and concepts of periodicity

# PROGRAM OVERVIEW

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### TOPICS FROM FUTURE COURSES: CCSS INTEGRATED PATHWAY MATHEMATICS III

<b>Math III</b>	<b>Topic introduced</b>	<b>Course/unit where addressed</b>	<b>How addressed</b>
<b>Unit 4A</b>	Finding the inverses of quadratic and other functions, including rational and trigonometric functions; making the connection between exponential functions and their inverses, logarithmic functions, as the method for solving exponential equations	Precalculus, Calculus, or Math IV	extended to complex logarithms and verifying inverses using compositions of functions
<b>Unit 4B</b>	Exploring the intervals where trigonometric functions are increasing and decreasing Using knowledge of function families to generate models that fit real-world phenomena	Precalculus, Calculus, or Math IV Precalculus, Calculus, or Math IV	creating inverses of trigonometric functions exploring odd and even functions with respect to trigonometric functions; studying and graphing more complex logarithmic and trigonometric functions