School of the Future | HONORS ALGEBRA 2 CURRICULUM MAP | 2025-2026

DRIVING QUESTIONS

How can fluency in the language of Algebra help me understand the world around me?

ENDURING UNDERSTANDINGS

Algebra is a symbolic language.

With a growth mindset, embracing challenges and mistakes, anyone can become good at math.

We can use Algebraic functions to model patterns that we notice.

LEARNING OUTCOMES

Students will be assessed on their level of mastery of the 9 academic learning outcomes listed below. Of these outcomes, 6 are related to *math content* (knowledge and skills), and 3 are related to *math practices*. These outcomes are consolidated from the New York State Next Generation Mathematics Learning Standards.

See the course syllabus for descriptions of the outcomes for this course.

Content Standards

1 Operations with Numbers
2 Bivariate Analysis
3 Functions
4 Exponential Functions
5 Polynomial Functions
6 Trigonometric Functions

Practice Standards

7 Reasoning
8 Precision
9 Modeling

SEQUENCE & PACING

The course begins with a short unit to assess and reinforce the incoming academic skills of the students. From this Foundations unit we proceed with the mathematical content.

UNIT

Semester 1

Unit 1 Foundations
Unit 2 Functions
Unit 3 Exponential Functions
Unit 4 Bivariate Analysis

Semester 2

Unit 5 The Number System
Unit 6 Polynomial Functions
Unit 7 Trigonometric Functions

<table>
<tr><th colspan="4">UNIT 1 | FOUNDATIONS</th></tr>
<tr><th>DESCRIPTION</th><th colspan="2">ESSENTIAL QUESTION</th><th>SCHEDULE</th></tr>
<tr><td>This unit focuses on key knowledge, skills, behaviors from which the study of algebra will build. It will activate students' prior knowledge and refresh skills. It will also establish productive classroom routines and behaviors.</td><td colspan="2">What math skills do I need to succeed in Algebra 2?</td><td>September</td></tr>
<tr><th>ENDURING UNDERSTANDINGS / Concepts</th><th colspan="2">TRANSFERABLE PRACTICES / Skills</th><th>TOPICS / VOCABULARY</th></tr>
<tr><td>● Success in Algebra 2 requires fluency in key math skills.
● Success in math begins with a growth mindset.
● Success in any class requires practicing productive habits.
● Mistakes are normal and important parts of learning.</td><td colspan="2">● Solve multi-step equations, including with distributive prop.
● Use order of operations to simplify expressions.
● Use exponent rules to simplify and rewrite expressions.
● Identify areas of growth and take action to improve.
● Identify mistakes and reflect on how they are helpful.
Extension Topics
● Literal equations
● Complex numbers</td><td>● base, exponent
● GEMDAS
● order of operations
● term, like term
● equation, expression
● equivalent expression
● inverse operations</td></tr>
<tr><th>LEARNING OUTCOMES</th><th>FORMATIVE ASSESSMENT</th><th>SUMMATIVE ASSESSMENT</th><th>RESOURCES</th></tr>
<tr><td>Operations with Numbers
Precision</td><td>● Diagnostic
● Homework
● Exit Tickets</td><td>● Quiz</td><td>● Holt Textbook
● New Visions
● DeltaMath</td></tr>
</table>

UNIT 1 | FOUNDATIONS	
TOPIC SEQUENCE (subject to change)	
1. Welcome 2. Diagnostic 3. Combining Like Terms 4. GEMDAS 5. Exponent Rules 6. Distribution 7. Solving Equations 8. Assessment	

UNIT 2 | FUNCTIONS

DESCRIPTION	ESSENTIAL QUESTION	SCHEDULE
A variety of function families will be explored. Recognizing them from patterns, tables, and words will be emphasized, as well as the mechanisms for transforming functions from the parent.	What makes algebraic functions … functional?	September - October

ENDURING UNDERSTANDINGS / Concepts	TRANSFERABLE PRACTICES / Skills	TOPICS / VOCABULARY
● Functions are special kinds of relations which we can use to model real world situations. ● A function maps each element in the domain to exactly one element in the range. ● Functions can be represented in multiple ways. ● Function families share similar graphs and properties. ● Functions within a family are transformations of its parent. ● The same types of transformations can be applied to any type of function with a similar effect. ● Type of change is what distinguishes function families.	● Read, write, evaluate function notation. ● Translate between equation, table, graph. ● Recognize translations, reflections, and stretches of functions from equations and graphs. ● Recognize different function families from tables, graphs. ● Identify key features over specific intervals. ● Determine inverse functions algebraically & graphically Extension Topics ● Piecewise functions ● Combine & compose functions from other functions	● domain / range ● input / output ● interval ● increasing / decreasing ● intercepts ● (average) rate of change ● parent function ● relation / function ● evaluate ● transformations ● translation / shift ● compression / stretch

LEARNING OUTCOMES	FORMATIVE ASSESSMENT	SUMMATIVE ASSESSMENT	RESOURCES
Operations with Numbers Functions Reasoning Precision	● Homework ● Do Nows ● Exit Tickets	● Writing prompts ● Quizzes ● Project: None	● Holt Textbook ● Problem Strings ● DeltaMath

UNIT 2 | FUNCTIONS	
TOPIC SEQUENCE (subject to change)	
1. Definition & Recognition 2. Notation 3. Domain and Range 4. Intervals 5. Features day 1 - extrema & intercepts 6. Features day 2 - increasing & decreasing 7. Features day 3 - positive & negative 8. Features day 4 - average rate of change 9. Vertical Transformations 10. Horizontal Transformations 11. Equations to Graphs / Graphs to Equations 12. Inverse Relations 13. Finding Inverse Functions by Algebra 14. Finding Inverse Functions by Graphing	

<table>
<tr><th colspan="4">UNIT 3 | EXPONENTIAL FUNCTIONS & LOGARITHMS</th></tr>
<tr><th>DESCRIPTION</th><th colspan="2">ESSENTIAL QUESTION</th><th>SCHEDULE</th></tr>
<tr><td>Exponential functions are excellent models for many real world contexts. This unit will emphasize discovery of the power of exponential growth and its many practical applications.</td><td colspan="2">How can I use exponential functions to help me meet a personal goal?</td><td>November - December</td></tr>
<tr><th>ENDURING UNDERSTANDINGS / Concepts</th><th colspan="2">TRANSFERABLE PRACTICES / Skills</th><th>TOPICS / VOCABULARY</th></tr>
<tr><td>● Exponential functions change by a common factor.
● Exponential growth is powerful - exponential functions will always eventually exceed other types of functions.
● A logarithm is an exponent.
● Exponentiation and logarithms are inverse operations.</td><td colspan="2">● Write, and evaluate functions using the General, Growth & Decay, and Compound Interest Formulas.
● Model financial situations involving interest.
● Transform exponential functions.
● Understand Euler’s number as representing continuous change.
● Rewrite exponential expressions as logarithmic expressions (and vice versa).
● Understand, identify, and use properties of exponents to solve exponential and logarithmic equations.
Extension Topics:
● Natural base applications - half-life
● Logistic functions
● Logarithmic Functions</td><td>● start value
● common factor / multiplier
● base / exponent
● exponential growth/decay
● appreciation / depreciation
● compounding
● asymptote
● Euler’s number
● logarithm
● argument
● index</td></tr>
<tr><th>LEARNING OUTCOMES</th><th>FORMATIVE ASSESSMENT</th><th>SUMMATIVE ASSESSMENT</th><th>RESOURCES</th></tr>
<tr><td>Operations with Numbers
Exponential Functions
Precision
Modeling</td><td>● Homework
● Do Nows
● Exit Tickets</td><td>● Writing prompts
● Quizzes
● Projects: Compounded</td><td>● Holt Textbook
● Problem Strings
● TEKS mini projects
● DeltaMath</td></tr>
</table>

UNIT 3 | EXPONENTIAL FUNCTIONS	
TOPIC SEQUENCE (subject to change)	
1. Linear vs Exponential Change 2. Repeated Multiplication 3. Intro to the General Form 4. TI-84 Skills 5. Modeling with General Form 6. Percent Change 7. Growth & Decay Form 8. Modeling with Growth & Decay Form 9. Compound Interest 10. Compound Interest Form 11. Euler's Constant 12. Continuous Compounding 13. Natural Base Applications 14. Intro to Logarithms 15. Evaluating Logs 16. Log Properties 17. Solving Exponents with Logs 18. Solving Logs with Exponents 19. Project	

<table>
<tr><th colspan="4">UNIT 4 | BIVARIATE ANALYSIS</th></tr>
<tr><th>DESCRIPTION</th><th colspan="2">ESSENTIAL QUESTION</th><th>SCHEDULE</th></tr>
<tr><td>A key goal of the course is to connect functions to questions we have about the world. Regression analysis of bivariate data makes that connection and we will be using it throughout the course.</td><td colspan="2">How can I use math to study relationships between two variables I’m interested in?</td><td>December - January</td></tr>
<tr><th>ENDURING UNDERSTANDINGS / Concepts</th><th colspan="2">TRANSFERABLE PRACTICES / Skills</th><th>TOPICS / VOCABULARY</th></tr>
<tr><td>● Regression can be used to make predictions from data.
● Correlation is a measure of the strength of relationship between two variables of interest.
● Correlation is necessary, but not sufficient, to indicate causation.
● Real world data can be messy. Mathematical models can use trends in the data to make predictions.</td><td colspan="2">● Create a scatter plot from a data set, including appropriate units and scaling of axes.
● Describe a data set qualitatively and quantitatively using academic vocabulary.
● Estimate and draw curves of best fit; use it to make predictions.
● Use technology to generate a linear regression for data.
● Reason and make arguments about causation.
● Create a residual plot and assess the fit of the regression.
● Generate and interpret nonlinear regressions.
Extension Topics
● Explore the effect of outliers on correlation.</td><td>● bivariate data
● independent / dependent
● scatter pot
● regression analysis
● correlation
● correlation coefficient
● coefficient of determination
● causation
● residual
● line of best fit
● outlier</td></tr>
<tr><th>LEARNING OUTCOMES</th><th>FORMATIVE ASSESSMENT</th><th>SUMMATIVE ASSESSMENT</th><th>RESOURCES</th></tr>
<tr><td>Bivariate Analysis
Reasoning
Precision
Modeling</td><td>● Homework
● Do Nows
● Exit tickets</td><td>● Quizzes
● Writing Prompts
● Project:
Math in the World</td><td>● Holt Textbook
● Problem Strings
● New Visions Unit 6</td></tr>
</table>

UNIT 5 | BIVARIATE ANALYSIS	
TOPIC SEQUENCE (subject to change)	
1. Bivariate Data 2. Scatter Plots 3. Correlation - qualitative 4. Correlation - quantitative 5. Regression 6. Using Regression 7. Residuals 8. Causation 9. Project	

<table>
<tr><th colspan="4">UNIT 5 | THE NUMBER SYSTEM</th></tr>
<tr><th>DESCRIPTION</th><th colspan="2">ESSENTIAL QUESTION</th><th>SCHEDULE</th></tr>
<tr><td>Students extend their understanding of the number system to explore polynomial functions with no real solutions.</td><td colspan="2">Are numbers real?</td><td>January - February</td></tr>
<tr><th>ENDURING UNDERSTANDINGS / Concepts</th><th colspan="2">TRANSFERABLE PRACTICES / Skills</th><th>TOPICS / VOCABULARY</th></tr>
<tr><td>● Simplest radical form is an international standard for representing irrational and complex numbers.
● Complex numbers extend the number system to address functions with no real solutions.
● The set of complex numbers is closed for all operations.</td><td colspan="2">● Write expressions in simplest radical form.
● Explain how complex numbers relate to the real number system.
● Perform arithmetic operations on complex numbers.
Extension Topics
● Graph complex numbers on the complex plane.</td><td>● real number system
● number subsets
● closure
● complex numbers
● imaginary numbers
● imaginary unit
● conjugate</td></tr>
<tr><th>LEARNING OUTCOMES</th><th>FORMATIVE ASSESSMENT</th><th>SUMMATIVE ASSESSMENT</th><th>RESOURCES</th></tr>
<tr><td>Operations with Numbers
Reasoning
Precision</td><td>● Homework
● Do Nows
● Exit Tickets</td><td>● Quizzes
● Projects:
None</td><td>● Holt Textbook
● Problem Strings
● DeltaMath
● TEKS mini projects</td></tr>
</table>

UNIT 6 | THE NUMBER SYSTEM	
TOPIC SEQUENCE (subject to change)	
1. Perfect Squares 2. Properties of Radicals 3. Simplest Radical Form 4. Real Number System 5. Imaginary numbers 6. Complex numbers 7. Complex addition & subtraction 8. Complex multiplication 9. Complex division	

<table>
<tr><th colspan="4">UNIT 6 | POLYNOMIAL FUNCTIONS</th></tr>
<tr><th>DESCRIPTION</th><th colspan="2">ESSENTIAL QUESTION</th><th>SCHEDULE</th></tr>
<tr><td>Polynomial functions apply to many types of real world contexts, and are a logical extension of quadratic functions, which are second degree polynomials.</td><td colspan="2">What types of real world contexts can be modeled with polynomial functions?</td><td>March - April</td></tr>
<tr><th>ENDURING UNDERSTANDINGS / Concepts</th><th colspan="2">TRANSFERABLE PRACTICES / Skills</th><th>TOPICS / VOCABULARY</th></tr>
<tr><td>● Numbers are abstract concepts, either discovered or invented by humans in order to solve real world problems.
● The degree of a polynomial function determines its behaviors and properties.
● The structure of polynomial graphs and equations gives insights into their roots.
● The Fundamental Theorem of Algebra proves that every polynomial of degree n has exactly n roots.</td><td colspan="2">● Add & subtract polynomials.
● Multiply polynomials.
● Perform polynomial long & synthetic division.
● Factor polynomials. Use the Factor Theorem.
● Find real roots using the Rat. and Irrat. Root Theorems.
● Solve quadratics with quadratic formula.
● Explain and use the Fundamental Theorem of Algebra.
● Explain and use the Complex Conjugate Theorem.
● Graph polynomial functions; predict their end behavior.
● Expand polynomials. Use the Binomial Theorem.
Extension Topics
● Curve fitting polynomial models.</td><td>● polynomial, binomial, etc.
● degree (of polynomial)
● leading coefficient
● quadratic/linear/constant term
● multiplicity
● end behavior
● local extrema
● Fundamental Theorem of Algebra (and associated theorems)</td></tr>
<tr><th>LEARNING OUTCOMES</th><th>FORMATIVE ASSESSMENT</th><th>SUMMATIVE ASSESSMENT</th><th>RESOURCES</th></tr>
<tr><td>Operations with Numbers
Polynomial Functions
Reasoning
Precision
Modeling</td><td>● Homework
● Do Nows
● Exit Tickets</td><td>● Quizzes
● Project:
TEKS problems</td><td>● Holt Textbook
● Problem Strings
● eMath
● DeltaMath</td></tr>
</table>

UNIT 7 | POLYNOMIAL FUNCTIONS	
TOPIC SEQUENCE (subject to change)	
1. Classifying Polynomials 2. Polynomial Functions - power functions, common differences, parents 3. Polynomial Addition & Subtraction 4. Polynomial Multiplication 5. Binomial Expansion - Pascal's Triangle 6. Binomial Expansion - Binomial Theorem 7. Polynomial Long Division 8. Polynomial Synthetic Division - Remainder Theorem 9. Factoring Polynomials - Factor Theorem 10. Finding Real Roots - Rational/Irrational Theorems 11. Finding Complex Roots - Complex Conjugate Root Theorem 12. Finding All Roots - Fundamental Theorem of Algebra 13. Graphing Polynomial Functions - end behavior	

<table>
<tr><th colspan="4">UNIT 7 | TRIGONOMETRIC FUNCTIONS</th></tr>
<tr><th>DESCRIPTION</th><th colspan="2">ESSENTIAL QUESTION</th><th>SCHEDULE</th></tr>
<tr><td>Students extend their prior knowledge of trigonometric ratios learned in Geometry, together with the unit circle and radian measure, to create and transform trigonometric functions of periodic phenomena.</td><td colspan="2">I thought trigonometry was about triangles. How is it related to periodic phenomena?</td><td>May - June</td></tr>
<tr><th>ENDURING UNDERSTANDINGS / Concepts</th><th colspan="2">TRANSFERABLE PRACTICES / Skills</th><th>TOPICS / VOCABULARY</th></tr>
<tr><td>● The features of a periodic function repeat over a constant interval.
● The unit circle illustrates properties and extends the domain of trigonometric functions.
● Trigonometric functions are characterized by their shape, period, and amplitude.
● Real world contexts that occur periodically can be modeled with trigonometric functions.</td><td colspan="2">● Define rotations and angle terminology.
● Develop the unit circle using sine and cosine ratios.
● Define radian angle measurement.
● Create parent sine and cosine functions from unit circle.
● Graph and transform sine and cosine functions.
● Model periodic phenomena using sine and cosine functions.
Extension Topics
● Reciprocal trigonometric functions & restricted domains.
● Variable amplitude and period.</td><td>● unit circle
● reference, coterminal angles
● angle of rotation
● sinusoidal
● sine, cosine, etc.
● reciprocal trig ratios
● radian
● period, frequency
● amplitude, midline
● periodic phenomenon</td></tr>
<tr><th>LEARNING OUTCOMES</th><th>FORMATIVE ASSESSMENT</th><th>SUMMATIVE ASSESSMENT</th><th>RESOURCES</th></tr>
<tr><td>Trigonometric Functions
Reasoning
Modeling</td><td>● Homework
● Do Nows
● Exit Tickets</td><td>● Writing prompts
● Quizzes
● Project:
Periodic Phenomena</td><td>● Holt Textbook
● Problem Strings
● DeltaMath
● eMath</td></tr>
</table>

UNIT 9 | TRIGONOMETRIC FUNCTIONS	
TOPIC SEQUENCE (subject to change)	
1. Angles of Rotation 2. Coterminal Angles 3. Reference Angles 4. Radians 5. Soh Cah Toa review 6. Unit Circle 7. Graphing Parent Sine & Cosine Functions 8. Transformations - discovery 9. Transformations - vertical 10. Transformations - vertical, equation from graph 11. Transformations - horizontal 12. Variable Amplitude and Period 13. Project	