ALGEBRA 2 COMMON CORE CURRICULUM

Code: M551 Full Year (1 Credit) Rank Weight: 1.00

Polynomials - From Base Ten to Base X
- Successive Differences in Polynomials
- The Multiplication of Polynomials
- The Division of Polynomials
- Comparing Methods - Long Division, Again?
- Putting It All Together
- Dividing by $x - a$ and by $x + a$
- Mental Math
- The Power of Algebra – Finding Pythagorean Triples
- The Special Role of Zero in Factoring

Factoring – Its Use and Its Obstacles
- Overcoming Obstacles in Factoring
- Mastering Factoring
- Graphing Factored Polynomials
- Structure in Graphs of Polynomial Functions
- Modeling with Polynomials – An Introduction
- Overcoming a Second Obstacle in Factoring – What If There Is a Remainder?
- The Remainder Theorem
- Modeling Riverbeds with Polynomials

Solving & Applying Equations – Polynomial, Rational, and Radical
- Equivalent Rational Expressions
- Comparing Rational Expressions
- Multiplying & Dividing Rational Expressions
- Adding & Subtracting Rational Expressions
- Solving Rational Equations
- Word Problems Leading to Rational Equations
- A Focus on Square Roots
- Solving Radical Equations
- Linear Systems in Three Variables
- Systems of Equations
- Graphing Systems of Equations
- The Definition of a Parabola
- Are All Parabolas Congruent?
- Are All Parabolas Similar?

A Surprise from Geometry – Complex Numbers Overcome All Obstacles
- Overcoming a Third Obstacle to Factoring – What if there are no real number solutions?
- A Surprising Boost from Geometry
- Complex Numbers as Solutions to Equations
- Factoring Extended to the Complex Realm
- Obstacles Resolved – A surprising Result

The Story of Trigonometry & Its Contexts
- Ferris Wheels – Tracking the Height of a Passenger Car
- The Height & Co-Height Functions of a Ferris Wheel
- From Circle-ometry to Trigonometry
- Extending the Domain of Sine & Cosine to All Real Numbers
- Why Call It Tangent?
- Secant and the Co-Functions
- Graphing the Sine & Cosine Functions
- Awkward! Who Chose the Number 360, Anyway?
- Basic Trigonometric Identities from Graphs

Understanding Trigonometric Functions & Putting Them to Use

- Transforming the Graph of the Sine Function
- Ferris Wheels – Using Trigonometric Functions to Model Cyclical Behavior
- Tides, Sound Waves, and Stock Markets
- Graphing the Tangent Function
- What Is a Trigonometric Identity?
- Proving Trigonometric Identities
- Trigonometric Identity Proofs

Real Numbers

- Integer Exponents
- Base 10 & Scientific Notation
- Rational Exponents – What are $2^{1/2}$ and $2^{1/3}$
- Properties of Exponents & Radicals
- Irrational Exponents – What are $2^{\sqrt{2}}$ and 2^{π}
- Euler's Number

Logarithms

- Bacteria & Exponential Growth
- The "WhatPower" Function
- Logarithms – How Many Digits Do You Need?
- Building Logarithmic Tables
- The Most Important Property of Logarithms
- Properties of Logarithms
- Changing the Base
- Solving Logarithmic Equations
- Why Were Logarithms Developed

Exponential & Logarithmic Functions and Their Graphs

- Rational & Irrational Numbers
- Graphing the Logarithm Function
- Graphs of Exponential Functions & Logarithmic Functions
- The Inverse Relationship Between Logarithmic & Exponential Functions
- Transformations of the Graphs of Logarithmic & Exponential Functions
- The Graph of the Natural Logarithm Function
- Choosing a Model

Using Logarithms in Modeling Situations

- Bean Counting
- Solving Exponential Equations
- Geometric Sequences & Exponential Growth and Decay
- Percent Rate of Change
- Modeling with Exponential Functions
- Newton's Law of Cooling, Revisited

Geometric Series & Finance

- The Mathematics Behind a Structured Savings Plan
- Buying a Car
- Credit Cards
- Buying a House
- The Million Dollar Problem

Modeling Data Distributions

- Distributions – Center, Shape & Spread
- Using a Curve to Model a Data Distribution
- Normal Distributions

Drawing Conclusions Using Data from a Sample

- Types of Statistical Studies
- Using Sample Data to Estimate a Population Characteristic
- Sampling Variability in the Sample Proportion

Margin of Error when Estimating a Population Proportion
Sampling Variability in the Sample Mean
Margin of Error when Estimating a Population Mean
Evaluating Reports Based on Data from a Sasmple

Drawing Conclusions Using Data from an Experiment

Experiments & the Role of Random Assignment
Differences Due to Random Assignment Alone
Ruling Out Chance
Drawing a Conclusion from an Experiment
Evaluating Reports Based on Data from an Experiment

Probability

Chance Experiments, Sample Spaces & Events
Calculating Probabilities of Events Using Two-Way Tables
Calculating Conditional Probabilities & Evaluating Independence Using Two-Way Tables
Events & Venn Diagrams
Probability Rules

Assessment: Students will take a district-wide at the end of the 2nd quarter and the NYS Algebra 2 Common Core Regents Examination in June. The Regents will be the final for the course.

Resources: https://www.engageny.org/resource/high-school-algebra-ii
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