

ALGEBRA 2 COMMON CORE CURRICULUM

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

Unit 1: 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 Primes

Radicals and Conjugates

The Power of Algebra—Finding Pythagorean Triples

The Special Role of Zero in Factoring

Unit 2: 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

Unit 3: Solving and Applying Equations—Polynomial, Rational, and Radical

Equivalent Rational Expressions

Comparing Rational Expressions

Multiplying and Dividing Rational Expressions

Adding and 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?

Unit 4: 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

Unit 5: The Story of Trigonometry and Its Contexts

Ferris Wheels—Tracking the Height of a Passenger Car

The Height and Co-Height Functions of a Ferris Wheel

From Circle-ometry to Trigonometry

Extending the Domain of Sine and Cosine to All Real Numbers

Why Call It Tangent?

Secant and the Co-Functions

Graphing the Sine and Cosine Functions

Awkward! Who Chose the Number 360, Anyway?

Basic Trigonometric Identities from Graphs

Unit 6: Understanding Trigonometric Functions and 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

Unit 7: Real Numbers

Integer Exponents

Base 10 and Scientific Notation

Rational Exponents—What are $2^{\frac{1}{2}}$ and $2^{\frac{1}{3}}$?

Properties of Exponents and Radicals

Irrational Exponents—What are $2^{\sqrt{2}}$ and 2^{π} ?

Euler's Number

Unit 8: Logarithms

Bacteria and 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

Unit: Exponential and Logarithmic Functions and their Graphs

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

Unit 10: Using Logarithms in Modeling Situations

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

Unit 11: Geometric Series and Finance

The Mathematics Behind a Structured Savings Plan
Buying a Car
Credit Cards
Buying a House
The Million Dollar Problem⁵

Unit 12: Modeling Data Distributions

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

Unit 13: 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 Sample

Unit 14: Drawing Conclusions Using Data from an Experiment

Experiments and 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

Unit 15: Probability

Chance Experiments, Sample Spaces, and Events

Calculating Probabilities of Events Using Two-Way Tables

Calculating Conditional Probabilities and Evaluating Independence Using Two-Way Tables

Events and Venn Diagrams

Probability Rules

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

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