Greenwich Public Schools Curriculum Overview

Algebra 2A

Personalized learning is achieved through standards-based, rigorous and relevant curriculum that is aligned to digital tools and resources.

Note: Teachers retain professional discretion in how the learning is presented based on the needs and interests of their students.

Course Description

Algebra 2A
Full Year
022200 6 Blocks 1 Credit
Prerequisite: C or better in Geometry A and a C or better in Algebra 1, or A- or better in Geometry B and A- or better in Extended Algebra with teacher recommendation and successful completion of summer work assigned by the Math Program Administrator.
This course covers quadratic functions, probability and the counting principle, complex numbers, polynomial functions, series and sequences, exponential and logarithmic functions, rational functions and measures of central tendency.

Unit Guide

Unit 1: Functions
Unit 2: Polynomial Functions
Unit 6: Counting Methods and Probability
Midterm Review & Midterm Exam*
Unit 3: Rational Expressions and Functions
Unit 4: Exponential and Logarithmic Functions
Unit 7: Data Analysis and Statistics
Unit 1b (from CCSS Alg 1/Honors Algebra 2): Patterns
Final Review & Final Exam*

*Note: Semester exam review packets, answer keys and formula sheets can be found by joining our Schoology Math Department Review Course, using COURSE access code P9V9X-H6V37.

Mathematical Practices

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.

Enduring Understandings:

- *Unit 1*: Functions help to model, analyze and predict situations.
- *Unit 2*: To analyze the structure of polynomial equations and their real life applications, we must extend the known rules of functions.
- *Unit 3*: To analyze the structure of rational expressions, we must extend the known rules of functions.
- *Unit 4*: Exponential functions model growth and/or decay phenomenon.
- *Unit 6*: Probability can be used to determine the outcome of decisions.
- *Unit 7*: Data interpretations help develop informed decisions and predictions.
- *Unit 1b*: Analyzing patterns and writing explicit rules (algebraic and geometric) provide a powerful way to extend patterns and make predictions.

Essential Questions:

Unit 1:

- How do you determine if a relation is a function?
- How do you evaluate a function?
- How do you find the domain of a function?
- How can the vertical line test be used to determine whether a graph is a function?
- How do you obtain information from or about the graph of a function?
- How do you identify changes in a graph's behavior?
- What are the essential properties of the functions listed in the library of functions?
- What are the patterns for the transformations of functions?
- How can tables, graphs and rules relating variables be used to answer real-world and mathematical questions about the relationships between variables?
- How does the shape of a graph, the patterns in a table, the parts of the rule or verbal description give clues about the way the variables are related to one another?

Unit 2:

- What is a quadratic function?
- What properties / characteristics of quadratic functions are necessary in order to analyze and graph?
- What are the advantages / disadvantages in having a quadratic function written in standard form? Vertex form? Intercept form?
- How does factoring assist in finding the zeros (roots / intercepts) of a quadratic function?
- How can we solve equations with complex and real roots?
- What strategies do we have for identifying real and complex roots?
- How is the process of completing the square used to solve quadratic equations?
- How does the discriminant test assist in determining the nature of a quadratic function's roots?
- How is the quadratic formula used to solve quadratic equations?
- How can you determine the equation of a quadratic function from its graph? From its given characteristics?
- How can quadratic functions model real world applications?
- How can a quadratic regression model assist in drawing conclusions?
- How do you perform operations with polynomial functions?
- How can you find all of the zeros of a polynomial function?
- How can you write a polynomial function given its zeros?
- How can you graph a polynomial function?
- How can a polynomial function model real world applications and assist in drawing conclusions?

Unit 3:

- What is the relationship between nth roots and rational exponents?
- How are the properties of rational functions related to the properties of integer exponents?
- What operations can be performed on a pair of functions to obtain a third function?
- How do you find the inverse relation of a given function?
- How can you graph a square root function?
- How can you graph a cube root function?
- How do you solve radical equations?
- How do you solve equations with rational exponents?
- What is the relationship between the variables in direct and inverse variation?
- How do translations impact the parent function?
- What is the process for graphing a general rational function?
- How do you multiply and divide rational expressions?
- How do you add and subtract rational expressions?
- How do you solve rational equations?

Unit 4:

- What does the graph of an exponential growth/decay model look like?
- How can exponential growth/decay models reflect real world applications?
- How does base *e* relate to exponential growth and decay?
- What is the relationship between logarithmic and exponential functions?
- What does the graph of a logarithmic function look like?
- How do you use the properties of logarithms to rewrite expressions?
- How do you solve exponential and logarithmic equations?
- How can you find an exponential regression model given a set of data?

Unit 6:

- How can you use the fundamental counting principle and permutations to calculate the number of choices for a situation?
- How can you use combinations to calculate the number of choices for a situation?
- How can combinations assist in binomial expansion?
- How can you determine the likelihood that an event will occur?
- How do you find the probability of compound events?
- How do you establish whether events are dependent or independent?
- How do you compute the probability of two events when the occurrence of one affects the probability of the other?

Unit 7:

- How do you describe data using statistical measures?
- How can the normal curve be used to approximate probability
- What does it mean for data to be skewed?
- How do you develop different sampling methods for collecting data?
- How can you identify flaws in survey questions and experiments?

Unit 1b:

- What is a sequence?
- What is a series?
- How do you determine if a sequence is arithmetic?
- How do you find the sum of a finite arithmetic series?
- How do you determine if a sequence is geometric?
- How do you find the sum of a finite geometric series?
- How do you find the sum of an infinite geometric series?
- How do sequences and series (both arithmetic and geometric) model real world applications

Resources and Assured Experiences

Textbook Information:
Algebra 2
McDougal Littell (2007)
ISBN 0-618-59541-4

GHS Capstone Task:
Vision of the Graduate #3 - Explore, define, and solve complex problems
- Futurama - to complete after Unit 4: Exponential and Logarithmic Functions

Extra Resources:
- Algebra & Trigonometry (Green/White Honors Algebra 2 book); Pearson (7th Edition); ISBN 0-13-411926-6
- CT DoE Math Model Curriculum Materials for Algebra 1
- Arlington Algebra Project

Quarterly Grading

Quarter Grades will be determined using the following components:
- Participation (includes Classwork) = 10%
- Preparation (includes Homework) = 10%
- Assessments (both Summative & Formative) = 80%

Connecticut Common Core State Standards

- *Unit 1*: CCSS.MATH.CONTENT.HSF.IF.C.7, C.8, C.9; HSF.BF.A.1, B.3.
- *Unit 2*: CCSS.MATH.CONTENT.HSA.APR.A.1, B.3; HSF.IF.B.4, C.7, C.8, C.9; HSA.SSE.A.2; HSA.REI.B.4, B.4b; HSN.CN.A.1, A.2, C.7.
- *Unit 3*: CCSS.MATH.CONTENT.HSA.REI.A.2; HSF.BF.B.3, B.4; HSA.APR.D.6, D.7; HSF.IF.C.7, C.7b
- *Unit 4*: CCSS.MATH.CONTENT.HSA.CED.A.1; HSF.BF.B.5; HSF.IF.B.4, B.5, C.7, C.7e, C.9; HSF.LE.A.4.
- *Unit 6*: CCSS.MATH.CONTENT.HSS.MD.B.6, B.7; HSS.CP.A.1, A.3, A.3, A.4, A.5, B.6, B.7, B.8, B.9.
- *Unit 7*: CCSS.MATH.CONTENT.HSS.ID.A.4; HSS.IC.B.3; 6.SP.A.2, A.3.
- *Unit 1b*: CCSS.MATH.CONTENT.HSF.BF.A.1, A.1a, A.2; HSA.SSE.B.4
- *Unit 5*: CCSS.MATH.CONTENT.HSF.TF.A.1, A.2, B.6, B.7; HSG.SRT.C.6, C.7, C.8.