

Mathematics

Fairfield Public Schools

ALGEBRA 2 and Above



Purpose of Tonight's Presentation

- Overview of the secondary math program
- Illustrations of different career interests
- Examples illustrating improvements to the curriculum
- Overview of the curriculum review process
- Resource search process & recommendation
- Next steps

Core Math Program

Algebra



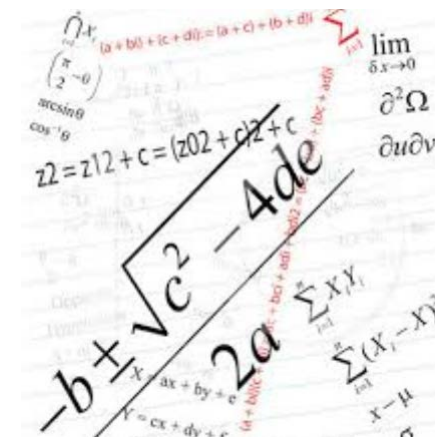
Geometry



Algebra 2



Electives



Elective Math Courses

AP Statistics

Probability & Statistics

Pre-Calculus

Trigonometry

Math Modeling

Financial Algebra

AP Calculus AB

AP Calculus BC

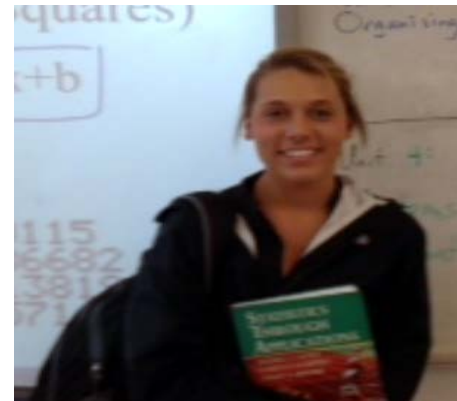
Multivariable Calculus

Introduction to Calculus

Elective Math Program

Career Opportunities

Science &
Engineering



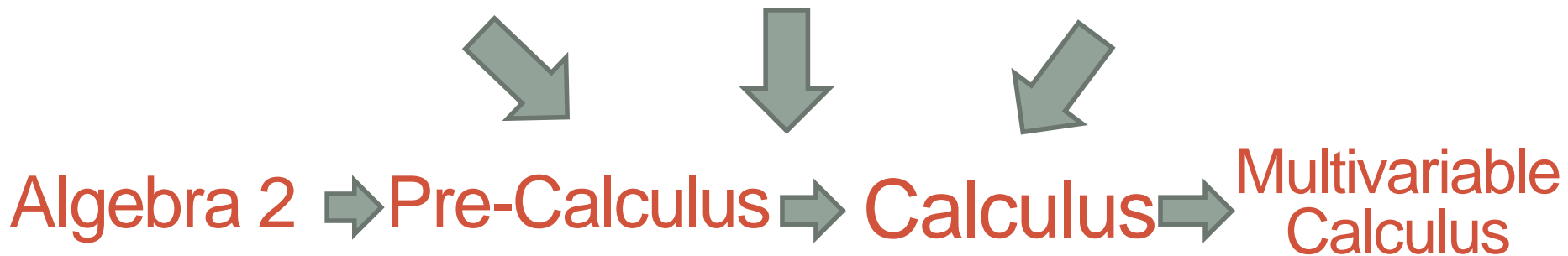
Humanities

Science & Engineering

Nana



Engineer, Physicist, Doctor, Chemist,
Astronomer, Biologist

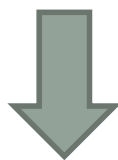


Humanities & Social Science

Cozette



Marketing, Psychologist, Education
Sociologist, Political Scientist



Algebra 2



Statistics

CURRICULUM PRESENTATION



Why was the curriculum reviewed?

- Last curriculum revision was 2006
- To align our courses to standards.
 - Connecticut Core Standards: Algebra 2 & Pre-Calculus
 - Advanced Placement: AB/BC Calculus, Statistics
- To vertically align to the BOE approved K-Geometry Curricula.

How was the curriculum developed?

- Research and review Connecticut's core standards and other standards
- Organized standards into units of study
- Parent focus group
- Curriculum posted to the district website for community feedback
- Feedback from former students and a college professor
- Curriculum council review and feedback

IMPROVEMENTS TO THE CURRICULUM DOCUMENTS

Pacing Guide

1st Marking Period		2nd Marking Period			3rd Marking Period		4th Marking Period		
September	October	November	December	January	February	March	April	May	June
Unit 1	Unit 2		Unit 3		Unit 4		Unit 5		
Functions, Graphs, and Limits	Derivatives		Applications of Derivatives		Integration		Applications of Integrals		
4 weeks	7 weeks		7 weeks		7 weeks		7 weeks		

Course Overview

Central Understandings

Insights learned from exploring generalizations through the essential questions. (Students will understand)

- Formal definitions and graphical interpretations of limits and continuity
- Formal definition, application and properties of a derivative.
- Formal definition, application and properties of an integral.

Essential Questions

- What is a limit and how can it be interpreted?
- What is a derivative?
- What is an integral?

Assessments

- Formative Assessments
- Summative Assessments

Unit 1 – Functions and Limits, 3 weeks [top](#)

This unit begins with the classic tangent to a curve problem by approximating secant lines that are getting closer and closer to becoming the tangent. Some practical applications of the tangent concept are explored such as the velocity problem. We then discuss limits formally, including one sided limits and infinite limits and limits that do not exist. This is further enhanced by discussing limit laws and the precise definition of a limit. Continuity and vertical asymptotes are discussed as they pertain to limits. This limit concept will then lead into the topic of the derivative and rates of change.

Big Ideas

The central organizing ideas and underlying structures of mathematics

- Calculus can be used to extend our mathematical boundaries.
- Calculus is the study of change.
- A concept of a limit allows you to determine the value of a function by getting really close to a specified value.
- The properties of limits follow many of the properties of real numbers.
- The type of continuity affects the limit of a function.
- Patterns can continue to infinity and yet still have a limit as to how big they can get.

Essential Questions

- What is Calculus?
- How do you determine a value of a function for a value that is restricted in the domain?
- How can you determine a limit of a function from different with functions illustrating different continuities?
- What are one-sided limits and infinite limits?

FUNCTIONS AND LIMITS

F-L.1

Demonstrate knowledge of both the formal definition and the graphical interpretation of limit of values of functions. This knowledge includes one-sided limits, infinite limits, and limits at infinity. Students know the definition of convergence and divergence of a function as the domain variable approaches either a number or infinity.

1.a Prove and use theorems evaluating the limits of sums, products, quotients, and composition of functions.

1.b Use graphical calculators to verify and estimate limits.

1.c Prove and use special limits, such as the limits of $\frac{\sin x}{x}$ and $\frac{1-\cos x}{x}$ as x tends to 0.

F-L.2

Demonstrate knowledge of both the formal definition and the graphical interpretation of continuity of a function.

F-L.3

Demonstrate an understanding and the application of the intermediate value theorem and the extreme value theorem.

PROPOSED COURSE IMPROVEMENTS

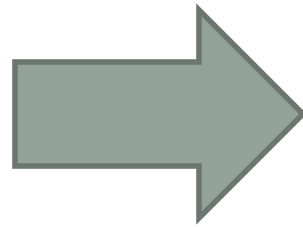
Algebra 2

Algebra 1 Review	Polynomial Expressions & Functions	Rational Expressions & Functions	Exponential Functions	Probability and Trigonometry Statistics
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Pre-Calculus

Algebra 2 Review	Polynomial Expressions & Functions	Trigonometry Matrix Operations	Vectors	Polar Coordinates (Graphs)
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**Personal
Finance**



**Financial
Algebra**

Financial Algebra

Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8
<u>Checking and Savings Accounts</u>	<u>Gross and Net Income</u>	<u>Managing Finances and Budgeting</u>	<u>Buying Goods and Services with Cash/Debit</u>	<u>Using Credit I</u>	<u>Using Credit II</u>	<u>Protecting Against Risk</u>	<u>Saving and Investing</u>

Algebraic Reasoning

Maintain Current Content

- AP Calculus AB
- AP Calculus BC
- Introduction to Calculus
- Multivariable Calculus
- Probability & Statistics
- AP Statistics
- Math Modeling
- Trigonometry

Student Feedback

Ashley Pierce (2011)

“I had to take Probability and Statistics again in college as a requirement for nursing and it made a lot more sense this time having the background information already.”

Arjun Jain (2013)

“Overall I think that I have a better foundation than most people [at Duke] in math especially due to the Multivariable Calculus class I took senior year. [It] gave me a step up on the rest of the class since I had some experience.”

Professor Feedback

- Dr. Benjamin Fine
 - Mathematics Professor at Fairfield University
- Algebra 2 Courses

“Address the algebraic and statistical material very well. The pacing and order of subjects in the two courses seems to be right on. I like that you spend time talking about the relationships between variables and on modeling.”
- Pre-Calculus Courses

“The Pre-Calculus courses cover what they should.”

Professor Feedback Continued

- AP Calculus Courses

“Your AP Calculus courses are standard and do prepare the students. In these courses you have the time to do the theory correctly. I like that Riemann sums for integrals are touched on. Make certain that the geometric and related rate nature of derivatives is stressed and not just computing derivatives.”

- AP Statistics:

“The AP Statistics course is standard and well put together. I like that enough time is placed on planning studies.”

RESOURCE SEARCH PROCESS

Resource Review Process

- Initial teacher search committee
- Final resource review committee
- Teacher survey
- Community viewing and feedback

Recommendations

- Maintain Current Resources:
 - Algebra 2
 - Calculus
 - Financial Algebra
 - Modeling/Trigonometry
 - Statistics
- Recommended Resource to Replace:
 - Pre-Calculus

Algebra 2 Textbook Recommendation

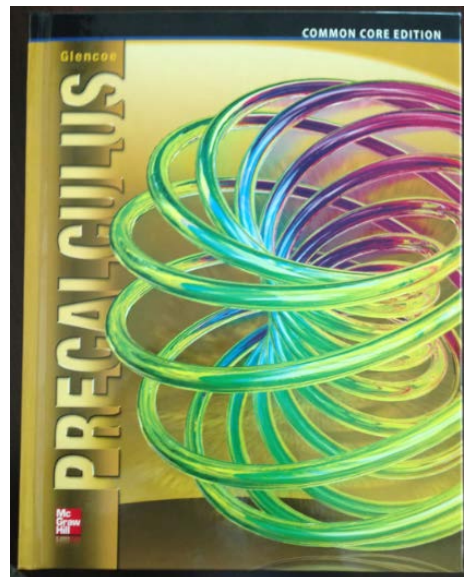
- Stay with current Algebra 2 Textbook
- Recently updated Algebra 2 textbooks similar to current book
- Teacher committee would like to wait to see resources released next year.

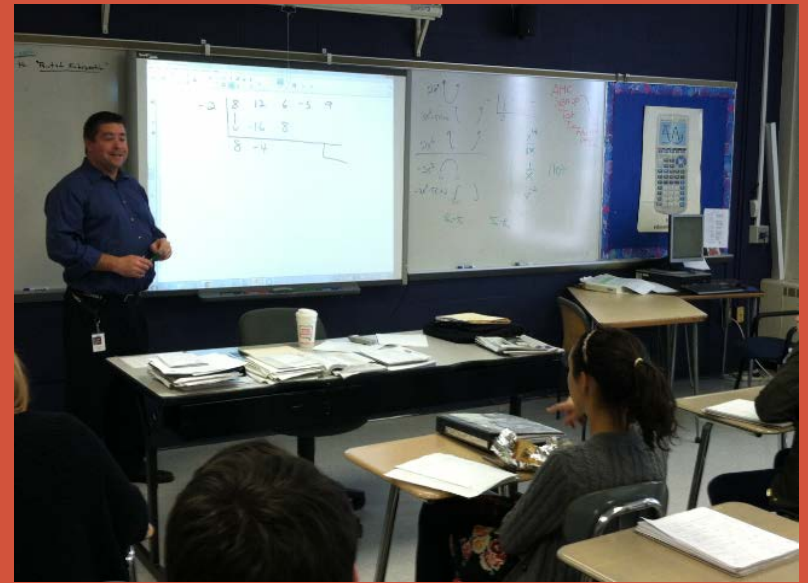
Pre-Calculus Process

- Initial Review of Resources by Teachers
- Vendor Presentations for Stakeholders
- Teacher Feedback
- Student Focus Group

Pre-Calculus Resource Recommendation

Glencoe Common Core Pre-Calculus





NEXT STEPS

Next Steps: Curriculum Implementation

- Curriculum implementation guides
- Common assessments from the curriculum
- Professional development

Next Steps:

Ongoing Evaluation

- Common assessments
 - internal
 - external
- Classroom observations

- **Pre-Calculus Resource Cost:**
 - \$ 51,200
- **Algebra 2 Resource Holding Cost**
 - \$ 75,000
- **Summer Work – Implementation Account**
 - \$ 10,100
- **Approximate Cost to District:**
 - \$ 136,300

Anticipated Costs

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Thank You and Questions

