A High School Math Curriculum Overview

9th Grade

Main Lessons

1. Permutations, Combinations & Probability
2. Descriptive Geometry.

Track Classes

Review middle school algebra
Laws of exponents
Arithmetic with polynomials
Solving systems of equations
Factoring
Solving quadratic equations
Word problems
Simplifying square roots
The quadratic formula & al-Khwarizmi's work
Rational expressions and equations
Negative and fractional exponents
Introduction to logarithms
Review of percents, unit conversions, proportions
Permutations, Combinations, Probability practice

10th Grade

Main Lessons

1. Greek Geometry (Pythagoras, Euclid, and Archimedes)
2. Intro to Trigonometry (& Surveying)

Track Classes

Constructions & theorems (from 6th and 7th gr.)
Area transformation problems
Circle geometry
The Geometry of the Triangle
Writing proofs
The works of Archimedes (sphere and π)
Laws of proportionality (Euclid, Book V)
Mensuration (incl. volume & scale factors)
Proof of Heron's formula for triangle's area
Thorough review of 9th grade algebra
Intro to Trigonometry (up to Law of Sines)
Vectors (might be done in the physics lesson)
Sequences and Series
Logarithms (building from 9th grade)
Exponential growth, including the number *e*
Math & Music

11th Grade

Main Lessons

1. The Philosophy and Geometry of René Descartes.
2. Projective Geometry.

Track Classes

Introduction to functions
Perm, Comb & Probability review and deepen
Problem solving in depth

Cartesian Geometry

- Graphing linear equations
- Graphing conic sections
- Graphing polynomial equations
- Graphing systems of equations

Logarithms (building from 10th grade)

Trigonometry

- The Six Trig Functions
- Law of Cosines; Law of Tangents
- The unit trig circle and radian measure

Imaginary & Complex Numbers

- The complex number plane
- De Moivre's Theorem

12th Grade

Main Lesson: Introduction to Calculus

Track Classes

Pre-Calculus Topics

- Analytical trig (identities & equations)
- Graphing trig functions
- Graphing exp. & logarithmic functions
- Graphing rational functions (asymptotes)

Calculus Topics

- Review and furthering of ML material
- Chain rule and Implicit differentiation
- Related rate & max/min problems

Other Possible Topics

- Business math topics (e.g., mortgage formula)
- Topics from economics
- Statistics in the media
- Introduction to Statistics
- Spherical trigonometry
- 3-D coordinate geometry
- Chaos theory & fractals
- Philosophy of math & Gödel's proof