The Foundation Syllabus:

Using a Scientific Calculator: Introduction plus 16 lessons
- C1: Introduction (5 Min.)
- C1: Basic Operations (6 Min.)
- C2: Real Numbers (6 Min.)
- C3: Negative Numbers (6 Min.)
- C4: Multiplication, Division and Percentage (7 Min.)
- C5: Percentage (3 Min.)
- C6: Using Memory (7 Min.)
- C7: Squares (3 Min.)
- C8: Square Roots (5 Min.)
- C9: Reciprocals (6 Min.)
- C10: Fractions (6 Min.)
- C11: Proper & Improper Fractions (6 Min.)
- C12: Converting Fractions to Decimals (6 Min.)
- C13: Trigonometry Operations (6 Min.)
- C14: Using Sine (6 Min.)
- C15: Using Cosine (6 Min.)
- C16: Using Tangent (6 Min.)

Pre-Algebra: Introduction plus 10 lessons:
- P1: Introduction (3 Min.)
- P1: Real Numbers, Integers & Rationals (5 Min.)
- P2: The Number Line & Negative Numbers (8 Min.)
- P3: Rules of Addition (10 Min.)
- P4: Rules of Multiplication (11 Min.)
- P5: Distributive Law (7 Min.)
- P6: Fractions (6 Min.)
- P7: Squares (5 Min.)
- P8: Square Roots (7 Min.)
- P9: Reciprocals (5 Min.)
- P10: Exponents (15 Min.)

Algebra: Introduction plus 10 lessons
- A1: Introduction (7 Min.)
- A1: Four Ways to Solve an Algebra Equation (5 Min.)
- A2: The Rule of Algebra (8 Min.)
- A3: X + A = B (9 Min.)
- A4: AX = B (6 Min.)
- A5: AX + B = CX + D (11 Min.)
- A6: A/X = B/C (8 Min.)
- A7: X squared = A (5 Min.)
- A8: Square Root of X = A (5 Min.)
- A9: SIN X = A (11 Min.)
- A10: COS X = A (8 Min.)

For more information, visit www.TriadMathInc.com
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Dr. Del's Practical Math Foundation

Geometry: 19 lessons
- G1: What is Geometry? (9 Min.)
- G2: Straight Lines and Angles (8 Min.)
- G3: Parallel Lines (19 Min.)
- G4: Triangle Basics and the Sum of Angles (11 Min.)
- G5: Right Triangles and the Pythagorean Theorem (12 Min.)
- G6: Similar Triangles (12 Min.)
- G7: Quadrilaterals, Polygons and Perimeters (14 Min.)
- G8: Area of Triangles and Rectangles (18 Min.)
- G9: Formulas for Polygons (11 Min.)
- G10: Circles and Circumferences (13 Min.)
- G11: Circles and Areas (13 Min.)
- G12: Circles and Special Properties (10 Min.)
- G13: Surface Areas of Blocks and Cylinders (9 Min.)
- G14: Surface Areas of Cones (7 Min.)
- G15: Volumes of Blocks and Cylinders (7 Min.)
- G16: Volumes of Cones (7 Min.)
- G17: Surface Areas of Spheres and Balls (7 Min.)
- G18: Archimedes Tombstone, Sphere Area and Volume (12 Min.)
- G19: When Geometry is not enough for Triangles (7 Min.)

Trigonometry: Introduction plus 8 lessons
- TI: Introduction (6 Min.)
- T1: Trigonometry Functions (16 Min.)
- T2: Sines (20 Min.)
- T3: Cosines (18 Min.)
- T4: Tangents (9 Min.)
- T5: Warning about SIN-1 (9 Min.)
- T6: Law of Sines (12 Min.)
- T7: Law of Cosines and the generalized Pythagorean Theorem (14 Min.)
- T8: Trigonometry beyond Practical Math (5 Min.)
Tier 3 Part 1 Table of Contents

T3 Part 1  Introduction

T3 P1 L1  The Real Number System (Simmons pp. 34 - 36)

T3 P1 L2A Notation and Rules (Simmons pp. 36 - 39)

T3 P1 L2B Notation and Rules (Simmons pp. 36 – 39)

T3 P1 L3  Integral Exponents (Simmons pp. 39 – 40)

T3 P1 L4  Root, Radical, Fractional Exponents (Simmons pp. 40 – 43)

T3 P1 L5  Polynomials (Simmons pp. 43- 45)

T3 P1 L6  Factoring Polynomials (Simmons pp. 45 – 46)

T3 P1 L7  Linear Equations & Rule of Algebra (Simmons pp. 46 – 49)

Plus: Review of Algebra and Rules from the Tier 2 Practical Math Foundation.

T3 P1 L8  Quadratic Equation (Simmons pp. 46 – 49)

T3 P1 L9  Inequalities and Absolute Values (Simmons pp. 49 – 50)

T3 P1 L10 Coordinates in a Plane (Simmons pp. 53 – 54)

T3 P1 L11 Functions and Graphs (Simmons pp. 51 – 53)

T3 P1 L12 Straight Lines & Linear Functions (Simmons pp. 55 – 56)

T3 P1 L13 Parallel and Perpendicular Lines (Simmons pp. 55 – 56)

T3 P1 L14 Intersecting Straight Lines (Custom Training)

You will learn a process you should master by practice.

Part 1 of Tier 3 should prepare you for a standard test you will need to pass to graduate from high school.

Part 2 of Tier 3 will teach you additional mathematics you will need to excel on the SAT and ACT and other exams.
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<td>T3 P2 L1  Prime Numbers</td>
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<tr>
<td>T3 P2 L2  Number Facts and Ideas</td>
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<td>T3 P2 L3  Percents and Percentage</td>
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<td>T3 P2 L9  Arithmetic Progressions</td>
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T3 P3 L1  Pep Talk
T3 P3 L2  Test Preparation
T3 P3 L3  Test Techniques
T3 P3 L4  Sample Problems A
T3 P3 L5  Sample Problems B
T3 P3 L6  Sample Problems C
T3 P3 L7  Sample Problems D
T3 P3 L8  More Fun
T3 P3 L9  Fun & Games
Tier 4  Table of Contents

*Precalculus Mathematics in a Nutshell*, and Notes will be used. Geometry, Algebra, Trigonometry, and Complex Numbers, with Wolfram-Alpha will be covered.

T4I  Introduction to Tier 4, and Overview

G1  Introduction to Geometry  Overview pp 2-3

G2  Triangles:  Angles, Parallel Lines, Area pp 4-5

G3  Triangles:  Similar  Congruent  p 6

G4  Pythagorean Theorem  pp 6-7

G5  Circles:  Pi,  Area, Sector  pp 7-8

G6  Circles:  Inscribed angles  pp 8-9

G7  Circles:  Tangents & Constructions,  Notes

G8  Angles:  Bisect, Trisect, Compass, Impossibilities  Notes

G9  Cylinder:  Area, Volume  pp 9-10

G10  Cone:  Overview  pp 10-11

G11  Cone:  Problems – Help pp 21-22

G12  Cone:  Optional Proof for Math majors  Simmons

G13  Sphere:  Volume and Area, Problems pp 22 - 23

G14  Sphere:  Optional  Proof with Cavalieri’s Principle pp 13-14

Interlude #1
Algebra

A1 Introduction to Algebra, Rules of Algebra Review p 33
A2 Basics: Numbers pp 34-35
A3 Review – Overview Tier 3 pp 36-50
A4 Review – Overview Tier 3 pp 51-56
*A5 Introduction to Wolfram-Alpha Notes
A6 Circles: pp 57-58
A7 Parabolas: 58-60
A8 Ellipses: Notes
A9 Hyperbolas: Notes
A10 Conic Sections
A11 Functions and Graphs pp 60-62
A12 Polynomial Division pp 65-67
A13 Logarithms Calculator pp 63-65
A14 Logarithms Exponents Notes
A15 Examples Log Scale

Interlude #2
Trigonometry

T1 Introduction to Trigonometry pp 92-93
T2 Review of some Analytical Geometry pp 93-96
T3 Radian Measure pp 96-98
T4 Trig Functions Circle Definition pp 98-100
T5 Trig Identities Intro pp 100-101
T6 Evaluating Trig Functions pp 101-103
T7 Trig functions graphs pp 103-105
T8 Frequency and Phase Notes
T9 Identities pp 105-6 sec 4 pp 114-5
T10 Identities and graphs Notes
T11 Proofs of Identities Appendix B pp 111-112
T12 Inverse Trig Functions pp 107-109
T13 Law of Sines and Cosines p 109
Complex Numbers

Complex Numbers will be treated with a modern geometric approach.

Real Numbers correspond to points on a straight line

Complex Numbers correspond to points in the plane.

Complex Numbers have many wonderful geometric properties that relate geometry and algebra.

Trigonometry is more fully understood when one understands complex numbers. Euler’s identity is the key to this.

Complex numbers are very powerful and indispensible in modern STEM subjects.

C1  Real Numbers Synopsis
C2  Complex Number Definition
C3  Complex Numbers Geometry
C4  Complex Number Geometry Proof
C5  Interlude for Inspiration y^x
C6  Interlude Preparation
C7  Wonderful Equation
C8  Motivation for Wonderful Equation
C9  Roots of Unity
C10  Clocks and Frequency
C11  Exponents and Logarithms
Algebra Special Topics

AST1 Mathematical Induction pp 83-84
AST2 Progressions and Permutations and Combinations Review Tier3 pp 74-80
AST3 Binomial Theorem pp 81-82
AST4 Linear Equations Determinants pp 68-70
AST5 Linear Equations 3D pp 71-73
AST6 Cone and Sphere, Calculus Preview pp 84-87

Geometry Special Topics for Math Majors/Teachers

GST1 Review of Geometry
GST2 Ceva’s Theorem pp 27-29
GST3 Heron’s & Brahmagupta’s Formulae p 18 Prob 20, pp 30-31
GST4 Geometry and Algebra, Analytical Geometry
GST5 Euclid Geometry vs Non-Euclidean Geometries
GST6 Calculus Preview
Tier 5 Calculus  Table of Contents 12-28-2014

Part 1.  Differential Calculus

T5 C1  Introduction to Calculus
   Approach to Learning Calculus
   Calculus Overview

T5 C2 Functions
   Graph Terms for Functions
   Function Graph Terms Sheet for Calculus
   Function Graphs #1 Worksheet
   Examples of Graphs

T5 C2 Functions
   More Examples

T5 C3 Derivative
   Differential Calculus
   Infinitesimals
   Derivative definitions
   Examples

T5 C4 Derivative Examples
   From definition
   From Wolfram Alpha
T5 C5 Applications to Graphing

Increasing/Decreasing

Max/Min

Points of Inflection

Concavity

T5 C6 Derivative Rules

Linear combination Rule

Leibniz Rule

Quotient Rule

T5 C7 Chain Rule

Derivative Examples from Rules

Wolfram Alpha examples

T5 C8 Implicit Differentiation

T5 C9 Relative Rates of Change

T5 C10 Inverse Functions

T5 C11 Series Expansions

T5 C12 Final Thoughts on Derivatives
Part 2. Integral Calculus

T5 C12 Integral Calculus Overview
T5 C13 Definition of Integral and the FTC
T5 C14 Techniques of Integration Overview
T5 C15 Applications of Integration Areas
T5 C16 Applications of Integration Arc Length
T5 C17 Applications of Integration Volumes Disc
T5 C18 Applications of Integration Volumes Shell
T5 C19 Applications of Integration Surface Areas
T5 C20 Parametric Functions Graphs
T5 C21 Parametric Functions Arc Length
T5 C22 Parametric Functions Tangent Line