

SAT II Math Level II

Course Name: SAT II math level II C

Duration of the Course: 13 sessions

Objective:

- Prepare Students for the SAT II math level II test
- Train students to be better critical thinkers and problem solvers

For Students: This course is for students who already completed Advanced Algebra II and plan to take SAT II math level II test in the near future.

Topics Covered:

- Complicated equations and inequalities
- Basics of functions
- Linear and quadratic functions
- Higher degree polynomial functions
- Sequences and series
- Geometry (2d and 3d)
- Exponential functions and logarithmic functions
- Rational functions, limit, asymptote
- Conic sections
- Arc, sector, and right triangle trigonometry
- Trigonometry in general and identities
- Law of sine and law of cosine
- Statistics
- Complex numbers, vectors, and matrix
- Counting and probability

Teaching Method:

- Teaching language: English.
- Go over major topics required for SAT II math level II test systematically
- Teach critical thinking skills measured by standardized tests and provide clear explanations of how to apply them
- Explain topics from several different angles to deepen students' understanding
- Focus on teaching students the fastest and most effective problem-solving methods
- Teach the appropriate strategies for estimating and eliminating absurd answer choices when "guessing" is necessary
- Diagnose bad math habits and practice techniques to avoid them

Teacher's Qualification—Yujuan Yun (员玉娟)

Ms. Yuan Yujuan always takes great pride in being a math /physics teacher and a coach. She feels her strengths and talents are well utilized in this stimulating career. As an experienced and dedicated teacher with in-depth mathematical and physics training, Ms. Yuan enjoys and is able to empower her students of diverse backgrounds to be successful math students, critical thinkers, and problem solvers by combining the best of the East---high standards, discipline and character education with the best of the West---a commitment to individualism, creativity and diversity.

- Certified high school Math, Physics, Special Education, and Mandarin teacher
- M.S in physics, B.S in math and physics education from China
- M.Ed from Umass Boston
- More than 10 years of public high school math and physics teaching experience in Boston
- Current Boston Public School math and physics teacher (high school)
- 18 years of SAT I math, SAT II math, Math competition, SAT II physics teaching and tutoring experience
- 9 years of high school math/physics teaching experience, 6 years of college math and physics teaching experience in China
- About 100 students got perfect scores on SAT I math and SAT II math test
- About 6 students got perfect scores on SAT II physics test
- About 20 students got accepted by top colleges such as Harvard, MIT, Princeton, and Brown
- Many students got amazing achievements in their middle school or high school math competition (math counts, AMC 8/10/12, ARML)

SAT II Math Level II
Teaching Plan

Lesson	Title	Content
1	Introduction to Functions	1.1 Definitions 1.2 Function Notation 1.3 Inverse Functions 1.4 Odd and Even Functions 1.5 Multivariable Functions 1.6 Variations
2	Linear Functions and Quadratic Functions	2.1 Linear Functions 2.2 Quadratic Functions
3	Higher Degree Polynomial Functions	3.1 Fundamental theorem of algebra 3.2 5 facts about the graphs of polynomial functions 3.3 7 useful facts for solving polynomial equations
4	Geometry and Measurement	4.1 Three Dimensional Figures (surface areas and volume) 4.2 Coordinate Geometry (midpoint and distance formulas)
5	Sequence and Series	5.1 Sequence in General 5.2 Series in General 5.3 Arithmetic Sequence and Series 5.4 Geometric Sequence and Series
6	Exponential and Logarithmic Functions	6.1 Properties of Exponents 6.2 Exponential Functions 6.3 Logarithmic Functions
7	Right Triangle Trigonometry	7.1 Angles and Their Measures 7.2 Right Triangle Trigonometry 7.3 Basic Identities 7.4 Double Angle Formulas
8	Trigonometric Functions and Their Graphs	8.1 Trigonometric Functions and Their Graphs 8.2 Inverse Trigonometric Functions 8.3 Law of Sine 8.4 Law of Cosine 8.5 Ambiguous Case (how many triangles can be formed)
9	Rational Functions and Limits	9.1 Rational Functions 9.2 Limits 9.3 Asymptotes

10	Statistics	10.1 Mean, Median, Mode 10.2 Range and Standard Deviation 10.3 Z-score 10.4 Linear, Quadratic, and Exponential Models
11	Conic Sections	11.1 Circles 11.2 Ellipse 11.3 Hyperbola
12	Polar Coordinates, Parametric Equations, Complex Numbers, Matrices, and Vectors	12.1 Polar Coordinates 12.2 Parametric Equations 12.3 Complex Numbers 12.4 Matrices 12.5 Vectors
13	Counting and Probability	13.1 Multiplication Principle 13.2 Permutation and Combination 13.3 Probability