SAT II Math Level II

Teacher: Lijing Cui (崔丽晶) Judysat@hotmail.com

Duration: 14 sessions

Book: Barron's SAT Subject Test Math Level 2
https://www.amazon.com/Barrons-SAT-Subject-Test-Online/dp/1438011148/ref=sr_1_3?crid=JOJ8WVNN0Z9T&keywords=barron

Objectives:

- Help students review and summarize all the test topics systematically
- Improve students problem solving skills
- Practice the tests and analyze the problems

Topics:

The class will review the following SAT test topics:

- Basics of functions
- Linear and quadratic functions
- Higher degree polynomial functions
- Complicated equations and inequalities
- 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.
- 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 student knowledge and understanding of math.
- 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

Teaching Plan

Week 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

Week 2
Linear Functions and Quadratic Functions

2. 1 Linear Functions
2. 2 Quadratic Functions

Week 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

Week 4
Geometry and Measurement

4.1 Three Dimensional Figures (surface areas and volume)
4.2 Coordinate Geometry (midpoint and distance formulas)

Week 5
Sequence and Series

5.1 5.2 5.3 5.4
Sequence in General Series in General
Arithmetic Sequence and Series Geometric Sequence and Series

Week 6
Exponential and Logarithmic Functions
6.1 Properties of Exponents
6.2 Exponential Functions

Week 7

Right Triangle Trigonometry
7.1 Angles and Their Measures
7.2 Right Triangle Trigonometry
7.3 Basic Identities

Week 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

Week 9
Rational Functions and Limits
9.1 Rational Functions
9.2 Limits
9.3 Asymptotes

Week 10
Statistics

10.1 Mean, Median, Mode
10.2 Range and Standard Deviation
10.3 Z-score
10.4 Linear, Quadratic, and Exponential Models

Week 11
Conic Sections

11.1 Circles
11.2 Ellipse
11.3 Hyperbola
11.4 Parabola

Week 12
Polar Coordinates, Parametric Equations, Complex Numbers

12.1 Polar Coordinates
12.2 Parametric Equations
12.3 Complex Numbers

Week 13
Matrices, and Vectors

12.1 Matrix addition and subtraction
12.2 Matrix multiplication

12.3 Vectors basic properties

Week 14
Counting and Probability
13.1 Multiplication Principle
13.2 Permutation and Combination
13.3 Probability

Teacher Profile:

Ms Lijing Cui has over 20 years of math teaching experience, especially SAT test preparation. She taught various grades of math and SAT math in NCLS and privately tutored math for high school students. She loves teaching high school students because she believes a person's passion for science and engineering starts right in high school. She encourages her students think out of box and stimulates their creativity. At the same time she helps her students build a solid foundation in math which is a fundamental analytical skill in today's world.

Ms Cui received her Ph.D in Physics at SUNY/Buffalo and worked as a postdoc at Harvard Physics Department and then taught physics in Harvard Medical school. About 20 years ago she moved on to technology consulting industry as data architect/data scientist. She uses her mathematical skills to build models and databases to analyze big data in the real world.