

SAT Math Curriculum Revised Spring 2018

Topic 1: Introduction to the SAT Math

Topic Overview: Students will take a Pre-Practice Exam on Khan Academy and learn about SAT scoring procedures, SAT Math question types, test-taking strategies, and common testing myths to help them better their scores on the SAT Math exam.

Standards:

CC.2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real-world or mathematical problems.

Essential Question (Core Concepts)

What makes a tool and/or strategy appropriate for a given task?

Objectives (Skills/Knowledge)

- Learn about the structure of the SAT Math test.
- Learn about how the test is scored
- Learn about the types of questions on the SAT Math test.
- Practice test-taking strategies.
- Explore common myths about the exam.

Vocabulary

Triage

Eliminate

Guess

Grid-in

Percentile Ranking

Letter of the Day

Suggested Activities/Strategies/Study Skills

- Pre-practice exam on Khan Academy to show growth throughout the course
- Practice test-taking strategy activity
- Reading the SAT Prep book
- Other relevant activities and online programs as needed

Assessments

Pre-Practice Test, Vocabulary Assessment, Strategy Practice Assessment

Additional Resources

Khan Academy, SAT Prep Book pages v-xii, and various technology programs such as Peardeck as well as other new technology programs

Topic 2: Prerequisite Skills and Calculator Usage

Topic Overview: Students will identify the skills necessary for completing the math section of SAT by reviewing previous concepts that are essential for all test questions, utilizing strategies to start a question, and distinguishing between questions that need a calculator and questions in which manual calculations are more efficient.

Standards:

CC.2.1.HS.F.1 Apply and extend the properties of exponents to solve problems with rational exponents

CC.2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real-world or mathematical problems.

CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.

Essential Question (Core Concepts)

What makes a tool and/or strategy appropriate for a given task?

How can patterns be used to describe relationships in mathematical situations?

Objectives (Skills/Knowledge)

- Identify skills necessary to obtain the full benefits of the math section of this book and to hone skills not fully developed
- Use efficiency tips to boost your Test Day speed
- Distinguish between questions that need a calculator and questions in which manual calculations are more efficient
- Utilize strategies that can help when you don't know how to start a question
- Identify how expert test takers use their calculators in a balanced way

Vocabulary

Order of operations

Commutative

Associative

Distributive

Common Denominator

Absolute Values

One-Variable Equations

Irrational Numbers

Coordinate Plane

Independent Variable

Dependent Variable

Axis of Symmetry

Equilateral Triangle

Isosceles Triangle

Suggested Activities/Strategies/Study Skills

- Math Dash for fractions to decimals to percent's
- Graphing Activity for parts of a coordinate plane on Demos
- Exam Practice Activity in Peardeck
- Reading the SAT Prep book
- Other relevant activities and online programs as needed

Assessments

Assessment on prerequisite skills - pre-test and post-test

Calculator versus non calculator question quiz

Additional Resources

Pre-work Chapter in SAT Math Prep pages 3-14 and various technology programs such as Schoology, Peardeck, and Desmos as well as other new technology programs

Topic 3: The Kaplan Method for Math & Linear Equations

Topic Overview: Students will recognize, simplify, and solve linear equations and linear equations involved in complex word problems to help them better their scores on the SAT Math exam.

Standards:

CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.

CC.2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multi-step problems.

CC.2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

CC.2.2.HS.C.1 Use the concept and notation of functions to interpret and apply them in terms of their context.

CC.2.2.HS.C.2 Graph and analyze functions and use their properties to make connections between the different representations.

CC.2.2.HS.C.3 Write functions or sequences that model relationships between two quantities.

CC.2.2.HS.C.5 Construct and compare linear, quadratic, and exponential models to solve problems.

CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships.

CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.

CC.2.2.HS.D.10 Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.

Essential Question (Core Concepts)

How is mathematics used to quantify, compare, represent, and model numbers? How can mathematics support effective communication?

How are relationships represented mathematically?

How can expressions, equations and inequalities be used to quantify, solve, model and/or analyze mathematical situations?

What makes a tool and/or strategy appropriate for a given task?

Objectives (Skills/Knowledge)

- Apply the Kaplan Method for Math to Heart of Algebra questions
- Recognize, simplify, and solve linear equations efficiently
- Translate complex word problems into equations
- Interpret the most commonly tested types of linear graphs

Vocabulary

Smartpoints

Linear Equations

Linear Inequalities

Strategic Thinking

Linear Word Problems

Linear Graphs

Suggested Activities/Strategies/Study Skills

- Formative Activity for Strategic Thinking
- Reading the SAT Prep book
- Graphing Activity on Desmos

- Exam Practice Activity in Peardeck
- Other relevant activities and online programs as needed

Assessments

Exam Practice in Workbook

Additional Resources

Chapter 1 in SAT Math Prep pages 17-44 and various technology programs such as Peardeck and Desmos as well as other new technology programs

Topic 4: Systems of Equations

Topic Overview: Students will determine the most efficient way to solve two-variable systems of equations and form multiple equations from word problems using strategic thinking strategies to help them better their scores on the SAT Math exam.

Standards:

CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships.

CC.2.2.HS.D.10 Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.

Essential Question (Core Concepts)

How can expressions, equations and inequalities be used to quantify, solve, model and/or analyze mathematical situations?

How are relationships represented mathematically?

Objectives (Skills/Knowledge)

- Distinguish between independent and dependent equations
- Solve two-variable systems of equations
- Determine the most efficient way to solve systems of equations
- Translate word problems into multiple equations

Vocabulary

Systems of Equations

Independent Equation

Dependent Equation

Overlapping Region

Maximum

Minimum

Substitution

Elimination/Combination

No Solution

Infinitely Many Solutions

Parallel Lines

Suggested Activities/Strategies/Study Skills

- Formative Activity for Strategic Thinking
- Reading the SAT Prep book
- Graphing Activity on Desmos
- Exam Practice Activity in Peardeck
- Other relevant activities and online programs as needed

Assessments

Exam Practice in Workbook

Additional Resources

Chapter 2 in SAT Math Prep pages 45-62 and various technology programs such as Peardeck and Desmos as well as other new technology programs

Topic 5: Introduction to Problem Solving

Topic Overview: Students will learn how to answer problem solving questions effectively and solve multi-part problems involving rates, ratios, proportions, and percentages to help them better their scores on the SAT Math exam.

Standards:

CC.2.1.HS.F.1 Apply and extend the properties of exponents to solve problems with rational exponents

CC.2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real-world or mathematical problems.

CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.

Essential Question (Core Concepts)

How is mathematics used to quantify, compare, represent, and model numbers?

How can mathematics support effective communication?

How are relationships represented mathematically?

What does it mean to estimate or analyze numerical quantities?

What makes a tool and/or strategy appropriate for a given task?

Objectives (Skills/Knowledge)

- Apply the Kaplan Method for Multi-Part Math Questions to answer Problem Solving questions effectively
- Solve multi-part problems involving rates, ratios, and proportions
- Use appropriate formulas to find percentages and single or multiple percent changes

Vocabulary

Rates

Measurements

Unit Conversions

Ratios

Proportions

Percentages

Suggested Activities/Strategies/Study Skills

- Formative Activity for Strategic Thinking
- Reading the SAT Prep book
- Graphing Activity on Desmos
- Exam Practice Activity in Peardeck
- Other relevant activities and online programs as needed

Assessments

Exam Practice in Workbook

Additional Resources

Chapter 3 in SAT Math Prep pages 65-99 and various technology programs such as Peardeck and Desmos as well as other new technology programs

Topic 6: Scatterplots

Topic Overview: Student will use a linear, quadratic, or exponential equation to describe data and trends between variables in scatterplots to help them better their scores on the SAT Math exam.

Standards:

CC.2.4.HS.B.1 Summarize, represent, and interpret data on a single count or measurement variable.

CC.2.4.HS.B.2 Summarize, represent, and interpret data on two categorical and quantitative variables.

CC.2.4.HS.B.3 Analyze linear models to make interpretations based on the data.

CC.2.4.HS.B.4 Recognize and evaluate random processes underlying statistical experiments.

CC.2.4.HS.B.5 Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.

CC.2.4.HS.B.6 Use the concepts of independence and conditional probability to interpret data.

CC.2.4.HS.B.7 Apply the rules of probability to compute probabilities of compound events in a uniform probability model.

Essential Question (Core Concepts)

What makes a tool and/or strategy appropriate for a given task?

In what ways are the mathematical attributes of objects or processes measured, calculated and/or interpreted?

How precise do measurements and calculations need to be?

How can patterns be used to describe relationships in mathematical situations?

How can recognizing repetition or regularity assist in solving problems more efficiently?

How can data be organized and represented to provide insight into the relationship between quantities?

How does the type of data influence the choice of display?

How can probability and data analysis be used to make predictions?

Objectives (Skills/Knowledge)

- Decide whether a linear, quadratic, or exponential model describes the data presented in a scatterplot
- Use an equation for a line of best fit to describe trends between variables in a scatterplot

Vocabulary

Units

Best-Fit Line

Data Points

Best-Fit Equation

Regression Equation

Growth

Decay

Modeling

Linear

Quadratic

Exponential

Suggested Activities/Strategies/Study Skills

- Formative Activity for Strategic Thinking
- Reading the SAT Prep book
- Graphing Activity on Desmos
- Exam Practice in Peardeck
- Other relevant activities and online programs as needed

Assessments

Exam Practice in Workbook

Additional Resources

Chapter 4 in SAT Math Prep pages 101-123 and various technology programs such as Peardeck and Desmos as well as other new technology programs

Topic 7: Two-Way Tables, Statistics, and Probability

Topic Overview: Students will use two-way tables to summarize data and calculate basic probabilities and evaluate scenarios to make inferences, justify conclusions, and determine appropriateness of data collection methods to help them better their scores on the SAT Math exam.

Standards:

CC.2.4.HS.B.1 Summarize, represent, and interpret data on a single count or measurement variable.

CC.2.4.HS.B.2 Summarize, represent, and interpret data on two categorical and quantitative variables.

CC.2.4.HS.B.3 Analyze linear models to make interpretations based on the data.

CC.2.4.HS.B.4 Recognize and evaluate random processes underlying statistical experiments.

CC.2.4.HS.B.5 Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.

CC.2.4.HS.B.6 Use the concepts of independence and conditional probability to interpret data.

CC.2.4.HS.B.7 Apply the rules of probability to compute probabilities of compound events in a uniform probability model.

Essential Question (Core Concepts)

What makes a tool and/or strategy appropriate for a given task?

In what ways are the mathematical attributes of objects or processes measured, calculated and/or interpreted?

How precise do measurements and calculations need to be?

How can patterns be used to describe relationships in mathematical situations?

How can recognizing repetition or regularity assist in solving problems more efficiently?

How can data be organized and represented to provide insight into the relationship between quantities?

How does the type of data influence the choice of display?

How can probability and data analysis be used to make predictions?

Objectives (Skills/Knowledge)

- Use two-way tables to summarize data and calculate basic probabilities
- Make inferences about population parameters based on sample data
- Evaluate scenarios/reports to make inferences, justify conclusions, and determine appropriateness of data collection methods

Vocabulary

Two-Way Tables

Mean

Median

Mode

Range

Standard Deviation

Margin of Error

Probability

Suggested Activities/Strategies/Study Skills

- Formative Activity for Strategic Thinking
- Reading the SAT Prep book
- Exam Practice Activity in Peardeck
- Walk-Around Activity
- Other relevant activities and online programs as needed

Assessments

Exam Practice in Workbook

Additional Resources

Chapter 5 in SAT Math Prep pages 125-159 and various technology programs such as Peardeck as well as other new technology programs

Topic 8: Exponents, Radicals, Polynomials, and Rational Expressions

Topic Overview: Students will simplify, write, and solve equations involving radicals and/or exponents and simplify polynomial expressions to help them better their scores on the SAT Math exam.

Standards:

CC.2.1.HS.F.1 Apply and extend the properties of exponents to solve problems with rational exponents

CC.2.2.HS.D.1 Interpret the structure of expressions to represent a quantity in terms of its context.

CC.2.2.HS.D.2 Write expressions in equivalent forms to solve problems.

CC.2.2.HS.D.3 Extend the knowledge of arithmetic operations and apply to polynomials.

CC.2.2.HS.D.4 Understand the relationship between zeros and factors of polynomials to make generalizations about functions and their graphs.

CC.2.2.HS.D.5 Use polynomial identities to solve problems.

CC.2.2.HS.D.6 Extend the knowledge of rational functions to rewrite in equivalent forms.

Essential Question (Core Concepts)

How is mathematics used to quantify, compare, represent, and model numbers?

How can mathematics support effective communication?

How are relationships represented mathematically?

How can expressions, equations and inequalities be used to quantify, solve, model and/or analyze mathematical situations?

What makes a tool and/or strategy appropriate for a given task?

Objectives (Skills/Knowledge)

- Simplify, rewrite, and solve equations involving radicals and/or exponents
- Perform arithmetic operations on polynomials
- Simplify polynomial expressions

Vocabulary

Exponents

Radicals

Base

Power

Polynomials

Degree

Zeros/Roots

Multiplicity

Simple Zero

Double Zero

Rational Expressions

Suggested Activities/Strategies/Study Skills

- Formative Activity for Strategic Thinking
- Reading the SAT Prep book
- Exam Practice Activity in Peardeck
- Walk-Around Activity
- Other relevant activities and online programs as needed

Assessments

Exam Practice in Workbook

Additional Resources

Chapter 6 in SAT Math Prep pages 163-189 and various technology programs such as Peardeck as well as other new technology programs

Topic 9: Functions & Function Notation

Topic Overview: Students will use function notation to answer questions containing equations, tables, and/or graphs, combine functions with basic operations, and interpret functions and functional statements that represent real-world scenarios to help them better their scores on the SAT Math exam.

Standards:

CC.2.2.HS.C.1 Use the concept and notation of functions to interpret and apply them in terms of their context.

CC.2.2.HS.C.2 Graph and analyze functions, and use their properties to make connections between the different representations.

CC.2.2.HS.C.3 Write functions or sequences that model relationships between two quantities.

CC.2.2.HS.C.4 Interpret the effects transformations have on functions, and find the inverses of functions.

CC.2.2.HS.C.5 Construct and compare linear, quadratic, and exponential models to solve problems.

CC.2.2.HS.C.6 Interpret functions in terms of the situations they model.

Essential Question (Core Concepts)

How is mathematics used to quantify, compare, represent, and model numbers?

How are relationships represented mathematically?

How can expressions, equations and inequalities be used to quantify, solve, model, and/or analyze mathematical situations?

How can recognizing repetition or regularity assist in solving problems more efficiently?

How can patterns be used to describe relationships in mathematical situations?

How can data be organized and represented to provide insight into the relationship between quantities?

How does the type of data influence the choice of display?

How can probability and data analysis be used to make predictions?

Objectives (Skills/Knowledge)

- Use function notation to answer questions containing equations, tables, and/or graphs
- Interpret functions and functional statements that represent real-world scenarios
- Combine functions properly using basic operations and compute compositions of functions correctly
- Determine if a function is increasing, decreasing, or constant and correctly apply transformations to a given function or functions

Vocabulary

Domain

Range

y-intercept

Function

Function Notation

Graphical Function Interpretation

Tabular Function Interpretation

Composition of Functions/Nested Functions

Piecewise Functions

Suggested Activities/Strategies/Study Skills

- Formative Activity for Strategic Thinking
- Reading the SAT Prep book
- Exam Practice in Peardeck
- Graphing Activity on Desmos
- Walk-Around Activity
- Other relevant activities and online programs as needed

Assessments

Exam Practice in Workbook

Additional Resources

Chapter 7 in SAT Math Prep pages 191-219 and various technology programs such as Peardeck and Desmos as well as other new technology programs

Topic 10: Quadratic Equations

Topic Overview: Graph and solve quadratic equations via algebra, graphing, or the quadratic formula to help them better their scores on the SAT Math exam.

Standards:

CC.2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers.

CC.2.1.HS.F.7 Apply concepts of complex numbers in polynomial identities and quadratic equations to solve problems.

Essential Question (Core Concepts)

How is mathematics used to quantify, compare, represent, and model numbers?

How can mathematics support effective communication? How are relationships represented mathematically?

How can expressions, equations and inequalities be used to quantify, solve, model and/or analyze mathematical situations?

What does it mean to estimate or analyze numerical quantities?

What makes a tool and/or strategy appropriate for a given task?

Objectives (Skills/Knowledge)

- Solve quadratic equations via algebra, graphing, or the quadratic formula.
- Sketch the graph of the given quadratic equation
- Identify how various components of a quadratic equation significant to its graph or a real-world scenario

Vocabulary

Quadratics

Factoring

Completing the Square

Grouping

Straightforward Math

Quadratic Formula

Parabolas

Suggested Activities/Strategies/Study Skills

- Formative Activity for Strategic Thinking
- Reading the SAT Prep book
- Exam Practice in Peardeck
- Graphing Activity on Desmos
- Walk-Around Activity
- Other relevant activities and online programs as needed

Assessments

Exam Practice in Workbook

Additional Resources

Chapter 8 in SAT Math Prep pages 221-245 and various technology programs such as Peardeck and Desmos as well as other new technology programs

Topic 10: Quadratic Equations

Topic Overview: Apply properties of lines, angles, and triangles and identify simple shapes within complex figures to answer questions and help them better their scores on the SAT Math exam

Standards:

CC.2.3.HS.A.1 Use geometric figures and their properties to represent transformations in the plane.

CC.2.3.HS.A.2 Apply rigid transformations to determine and explain congruence.

CC.2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.

CC.2.3.HS.A.5 Create justifications based on transformations to establish similarity of plane figures.

CC.2.3.HS.A.6 Verify and apply theorems involving similarity as they relate to plane figures.

CC.2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles.

CC.2.3.HS.A.11 Apply coordinate geometry to prove simple geometric theorems algebraically.

CC.2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Essential Question (Core Concepts)

How can patterns be used to describe relationships in mathematical situations?

How can recognizing repetition or regularity assist in solving problems more efficiently?

How are spatial relationships, including shape and dimension, used to draw, construct, model, and represent real situations or solve problems?

How can the application of the attributes of geometric shapes support mathematical reasoning and problem solving?

How can geometric properties and theorems be used to describe, model, and analyze situations?

Objectives (Skills/Knowledge)

- Apply the properties of lines and angles to solve geometry questions
- Use the Pythagorean theorem, Pythagorean triplets, and special right triangles to answer questions involving triangles
- Identify simple shapes within complex figures and use them to solve questions

Vocabulary

Lines

Angles

Acute

Right

Obtuse

Straight

Complementary

Supplementary

Triangles

Interior Angles

Exterior Angles

Pythagorean Theorem

Pythagorean Triplets

Special Right Triangles

45-45-90

30-60-90

Complex Figures

Suggested Activities/Strategies/Study Skills

- Formative Activity for Strategic Thinking
- Reading the SAT Prep book
- Exam Practice Activity in Peardeck
- Graphing Activity on Desmos
- Other relevant activities and online programs as needed

Assessments

Exam Practice in Workbook

Additional Resources

Chapter 9 in SAT Math Prep pages 249-276 and various technology programs such as Peardeck and Desmos as well as other new technology programs