SAT® Math Test
Curriculum Review Worksheets

Introduction

Curriculum Review Worksheets are designed to help you
- understand many of the skills and knowledge that are assessed on the SAT Suite of Assessments Math Tests;
- review student performance;
- identify skills and knowledge that need additional instruction and support; and
- develop a plan for implementation.

The curriculum review worksheets consist of a set of tables addressing most of the skills and knowledge assessed on the SAT Suite Math Tests. Each table includes description of a skill or knowledge and provides a structure to guide you as you evaluate the place of that skill or knowledge in your curriculum.

Each skill/knowledge table includes the following elements:
1. The name and definition of the skill or knowledge (or skill/knowledge area)
2. Questions guiding you to consider the place of the skill or knowledge in your curriculum
3. An indication of which SAT Suite subscore(s) the skill or knowledge is associated with
   Definitions of the subscores appear below.
4. A series of statements describing the ways in and extent to which students scoring in various score ranges on the Math Test (e.g., 20–24) are typically able to demonstrate attainment of the skill or knowledge, and spaces where you can indicate which of these statements best reflects your students' general level of attainment

> **To use these worksheets, please review the following resources:**
> - K-12 Score Reporting Portal data
> - District/school curriculum maps Released SAT practice tests
> - *Skills Insight for the SAT Suite* (https://collegereadiness.collegeboard.org/pdf/skills-insight-sat-suite.pdf)
> - *The College and Career Readiness Benchmarks for the SAT Suite of Assessments* (https://collegereadiness.collegeboard.org/pdf/educator-benchmark-brief.pdf)

> The statements in the tables are taken from *Skills Insight for the SAT*, linked to above. The Skills Insight describes typical performance of students scoring in various score ranges on the Math Tests (and other SAT Suite tests). The Skills Insight statements are generalizations based on analysis of hundreds of test questions and on the performance data of thousands of students taking one of the SAT Suite assessments. In a few cases, identified in this set of worksheets by dark gray bands, student performance has to date been too inconsistent to allow for valid generalizations.

In each table, a light gray band signals that the 30–34 score range contains the college and career readiness test-level benchmark (31.5 for the SAT Math Test). More information about the benchmark, as well as benchmarks by grade for grades 8 through 11, can be found in *The College and Career Readiness Benchmarks for the SAT Suite of Assessments*, also linked to above.

Subscores

The set of tables in this document includes abbreviations for the three subscores associated with the SAT Suite Math Tests. Subscores identify areas of concentration on the tests and consequently have potential instructional value.

The three subscores associated with the Math Tests are as follows:

- **Heart of Algebra (HOA)**: Questions that assess students' ability to analyze, fluently solve, and create linear equations and inequalities. Students will also be expected to analyze and fluently solve equations and systems of equations using multiple techniques.
- **Problem Solving and Data Analysis (PSD)**: Questions that focus on quantities and their units, proportional relationships, percentages, univariate and bivariate data analysis, probability, and core concepts of statistics.
- **Passport to Advanced Math (PAM)**: Questions that focus on the structure of expressions and the ability to analyze, manipulate, and rewrite these expressions. Students will also be expected to analyze, fluently solve, and create non-linear equations.
- Note that some Math Test questions do not contribute to any subscore. This is not to suggest that those questions and the skills and knowledge they assess are unimportant; rather, those questions focus on other skills and knowledge important to college and career readiness.

The College Board decided to focus on these subscores based on the best available evidence about essential college and career readiness and success requirements.

Procedure

The following is a step-by-step guide for using this set of worksheets.
1. Understand how your students are performing on the SAT Suite Math Test.
   a. Review your school and district mean performance on the Math Test and associated subscores (HOA, PSD, and PAM). Record this performance data in the appropriate spaces in the "How Are Students Performing?" table.
   b. Considering the performance data and the subscore definitions, identify which domain(s) have the most potential for improvement in the space below the table.

2. Familiarize yourself with the Math Test.
   a. Review Math Test directions, questions, and answer explanations from the released SAT practice tests to better understand how skills and knowledge are assessed.
   b. Use the subscore information in this document to better understand how Heart of Algebra, Problem Solving and Data Analysis, and Passport to Advanced Math are measured on the test.

3. Analyze your curriculum. Using this set of curriculum review worksheets and your curriculum maps, identify for each skill/knowledge (area) in the tables below (e.g., Development / Proposition)

    a. whether the skill/knowledge is **explicitly** taught in your curriculum;
    b. (if "yes") in which course(s)/grade level(s) the skill/knowledge is explicitly taught;
    c. in which course(s)/grade level(s) students must demonstrate proficiency in this skill/knowledge; and
    d. which of the (generally) four levels of performance described (e.g., at the 20–24 score range on the Math Tests) best represents the **highest** level at which your students generally demonstrate understanding of the skill/knowledge (You may instead indicate that your students' attainment is "below" the lowest level represented or "above" the highest level represented.)

Explicit is stressed here because instruction often touches on skills/knowledge without directly addressing them, making student acquisition less certain.

4. Develop an action plan.

    a. Based on the data gathered above, identify three to five skills/knowledge (or skill/knowledge areas, such as Sentence Structure) to devote consistent attention to.
    b. Use the Skills Insight Suggestions for Improvement as well as other resources to design instructional strategies to foster improvement.
    c. Set a time line for implementation of the strategies.
    d. List the resources needed for implementation.
    e. Identify means of assessing, formally or informally, whether teaching and learning have improved in these areas.

Use the Notes space to track questions, plans for addressing issues, and next steps.

How Are Students Performing?

In the spaces below record the **mean scores** at the school and district level for the Math Test and for the associated subscores. (Definitions of the subscores can be found in the introductory materials for this set of curriculum review worksheets, and the skill/knowledge tables below show how individual skills/knowledge map onto the subscores.) In the space below the table, identify opportunities for improvement.

	Math Test	Heart of Algebra	Problem Solving and Data Analysis	Passport to Advanced Math
School				
District				

Opportunities for improvement:

SAT Math Test Academic Skills and Knowledge
This area focuses on **linear equations in one variable**.

Content Description: The student will:

1. Create and use linear equations in one variable to solve problems in a variety of contexts.
2. Create a linear equation in one variable, and when in context interpret solutions in terms of the context.
3. Solve a linear equation in one variable, making strategic use of algebraic structure.
4. For a linear equation in one variable,
   a. interpret a constant, variable, factor, or term in a context;
   b. determine the conditions under which the equation has no solution, a unique solution, or infinitely many solutions.
5. Fluently solve a linear equation in one variable.

Is this skill/knowledge **explicitly** taught in your curriculum?			Yes	No
Score range	Sub-score	Skill/knowledge	If "yes," in which course(s)/grade level(s) is this skill/knowledge explicitly taught? When are students expected to demonstrate proficiency?	
15–19	HOA	Create a simple expression in one variable that represents a context Evaluate a one-variable expression by substituting a value for the variable		
20–24	HOA	Create an expression or equation in one variable that models a context		
25–29	HOA	Solve a linear equation in one variable Interpret a term from a linear equation in one variable in the form $ax + b = c$		
30–34	HOA	Determine the conditions under which a linear equation in one variable has no solution, one solution, or infinitely many solutions Solve a linear equation in one variable that requires computation with fractions or decimal		
35–40	HOA	Create and solve a linear equation in one variable representing a context, utilizing insight to identify the correct coefficients and constants in the equation Make connections between different representations of linear equations in one variable; these representations often include symbolic representations, which may contain variable constant		

Notes

SAT Math Test Academic Skills and Knowledge
This area focuses on **linear functions**.

Content Description: The student will:

1. Create and use linear functions to solve problems in a variety of contexts.
2. Create a linear function to model a relationship between two quantities.
3. For a linear function that represents a context,
   a. interpret the meaning of an input/output pair, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage;
   b. given an input value, find and/or interpret the output value using the given representation;
   c. given an output value, find and/or interpret the input value using the given representation, if it exists.
4. Make connections between verbal, tabular, algebraic, and graphical representations of a linear function by
   a. deriving one representation from the other;
   b. identifying features of one representation given another representation;
   c. determining how a graph is affected by a change to its equation.
5. Write the rule for a linear function given two input/output pairs or one input/output pair and the rate of change.

Is this skill/knowledge **explicitly** taught in your curriculum?			Yes	No
Score range	Sub-score	Skill/knowledge	If "yes," in which course(s)/grade level(s) is this skill/knowledge explicitly taught? When are students expected to demonstrate proficiency?	
20–24	HOA	*Students scoring in this range are not able to demonstrate consistent attainment of these content descriptions*		
25–29	HOA	Interpret a term from a linear equation in two variables in slope-intercept form		
30–34	HOA	Make connections between different representations of linear functions		
35–40	HOA	Make connections between different representations of linear functions; these representations often include symbolic representations, which may contain variable constant		
Notes				

SAT Math Test Academic Skills and Knowledge
This area focuses on **linear equations in two variables**.

Content Description: The student will:
1. Create and use a linear equation in two variables to solve problems in a variety of contexts.
2. Create a linear equation in two variables to model a constraint or condition on two quantities.
3. For a linear equation in two variables that represents a context,
    a. interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage;
    b. given a value of one quantity in the relationship, find a value of the other, if it exists.
4. Make connections between tabular, algebraic, and graphical representations of a linear equation in two variables by
    a. deriving one representation from the other;
    b. identifying features of one representation given the other representation;
    c. determining how a graph is affected by a change to its equation.
5. Write an equation for a line given two points on the line, one point and the slope of the line, or one point and a parallel or perpendicular line.

Is this skill/knowledge **explicitly** taught in your curriculum?			Yes	No
Score range	Sub-score	Skill/knowledge	If "yes," in which course(s)/grade level(s) is this skill/knowledge explicitly taught? When are students expected to demonstrate proficiency?	
20–24	HOA	Create a linear expression or equation in two variables that models a context		
25–29	HOA	Interpret a term from a linear equation in two variables in standard form Create a linear equation in two variables that models a complex context Make connections between different representations (graphs, equations, tables, etc.) of linear relationships between two variables Identify a key feature of one representation (graph, equation, table, etc.) of a linear relationship based on information about a different representation		
30–34	HOA	Create and use linear relationships to solve a problem Interpret terms in linear relationships shown in graphs or in linear equations that are not in standard form or slope-intercept form Make connections between different representations linear equations in two variables		

| 35–40 | HOA | Create and use a linear equation in two variables, where the equation represents a context, utilizing insight to identify the correct coefficients and constants in the equation Interpret a term in a linear relationship that is presented as an equation or a graph with insight and precision Make connections between different representations of linear equations in two variables; these representations often include symbolic representations, which may contain variable constant | |
| Notes | | | |

SAT Math Test Academic Skills and Knowledge
This area focuses on **systems of two linear equations in two variables**.

Content Description: The student will:

1. Create and use a system of two linear equations in two variables to solve problems in a variety of contexts.
2. Create a system of linear equations in two variables, and when in context interpret solutions in terms of the context.
3. Make connections between tabular, algebraic, and graphical representations of the system by deriving one representation from the other.
4. Solve a system of two linear equations in two variables, making strategic use of algebraic structure.
5. For a system of linear equations in two variables,
   a. interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage;
   b. determine the conditions under which the system has no solution, a unique solution, or infinitely many solutions.
6. Fluently solve a system of linear equations in two variables.

Is this skill/knowledge **explicitly** taught in your curriculum?			Yes	No
Score range	Sub-score	Skill/knowledge	If "yes," in which course(s)/grade level(s) is this skill/knowledge explicitly taught? When are students expected to demonstrate proficiency?	
20–24	HOA	*Students scoring in this range are not able to demonstrate consistent attainment of these content descriptions*		
25–29	HOA	Create a system of two linear equations in two variables that models a context Solve a system of two linear equations in two variables		
30–34	HOA	Make connections between different representations of systems of two linear equations in two variables Determine the conditions under which a system of two linear equations in two variables written in standard form has no solution, one solution, or infinitely many solutions Solve a system of linear equations in two variables that requires computation with fractions or decimal		

35–40	HOA	Make connections between different representations of systems of two linear equations in two variables; these representations often include symbolic representations, which may contain variable constant Determine the conditions under which a system of two linear equations in two variables written in nonstandard form has no solution, one solution, or infinitely many solutions	
Notes			

SAT Math Test Academic Skills and Knowledge
This area focuses on **linear inequalities in one or two variables**.

Content Description: The student will:
1. Create and use linear inequalities in one or two variables to solve problems in a variety of contexts.
2. Create linear inequalities in one or two variables, and when in context interpret the solutions in terms of the context.
3. For linear inequalities in one or two variables, interpret a constant, variable, factor, or term, including situations where seeing structure provides an advantage.
4. Make connections between tabular, algebraic, and graphical representations of linear inequalities in one or two variables by deriving one from the other.
5. Given a linear inequality or system of linear inequalities, interpret a point in the solution set.

Is this skill/knowledge **explicitly** taught in your curriculum?			Yes	No
Score range	Sub-score	Skill/knowledge	If "yes," in which course(s)/grade level(s) is this skill/knowledge explicitly taught? When are students expected to demonstrate proficiency?	
20–24	HOA	Find a number that satisfies a linear inequality in context		
25–29	HOA	Create an inequality in one or two variables based on a verbal description of a relationship Solve linear equations in which a linear expression is used as a variable		
30–34	HOA	Create an inequality in one or two variables that represents a relationship Make connections between different representations of linear inequalities		
35–40	HOA	Create and use an inequality in one or two variables, where the equation represents a context, utilizing insight to identify the correct coefficients and constants in the inequality Make connections between different representations of linear inequalities; these representations often include symbolic representations, which may contain variable constant		
Notes				

SAT Math Test Academic Skills and Knowledge
This area focuses on **Ratios, rates, proportional relationships, and units**.

Content Description: The student will:

1. Apply proportional relationships, ratios, rates, and units in a wide variety of contexts. Examples include but are not limited to scale drawings and problems in the natural and social sciences.
2. Solve problems involving
   a. derived units, including those that arise from products (e.g., kilowatt-hours) and quotients (e.g., population per square kilometer);
   b. unit conversion, including currency exchange and conversion between different measurement systems.
3. Understand and use the fact that when two quantities are in a proportional relationship, if one changes by a scale factor, then the other also changes by the same scale factor.

Is this skill/knowledge **explicitly** taught in your curriculum?			Yes	No
Score range	Sub-score	Skill/knowledge	If "yes," in which course(s)/grade level(s) is this skill/knowledge explicitly taught? When are students expected to demonstrate proficiency?	
15–19	PSD	Create a rate based on a context and use the rate to solve a simple problem Use common English Conversions (e.g., 1 hour = 60 minutes, 1 foot = 12 inches) to find and equivalent rate		
20–24	PSD	Identify a ratio or a fraction based on a context Use proportions to compare quantities and find missing values Solve problems that involve converting units within the same measurement system		
25–29	PSD	Identify, interpret, and use ratios, proportions, and rates, expressing them in equivalent forms, to solve real-world problems Convert units one or more times to solve a contextual problem Estimate/find a proportion, rate, percent, or fraction from a graph or a table Solve problems involving derived units or unit conversion between different measurement systems		

30–34	PSD	Solve mixture problems, using proportional reasoning Interpret and compare unit rates, ratios, or rates of change that are based in a context Solve multistep problems involving rates, proportions, unit conversion, percentages, and density	
35–40	PSD	Convert units and create and use ratios, proportions, percents, rates, and unit rates to solve problems	
Notes			

SAT Math Test Academic Skills and Knowledge
This area focuses on **percentages**.

Content Description: The student will:

1. Use percentages to solve problems in a variety of contexts. Examples include, but are not limited to, discounts, interest, taxes, tips, and percent increases and decreases for many different quantities.
2. Understand and use the relationship between percent change and growth factor (5% and 1.05, for example); include percentages greater than or equal to 100%.

Is this skill/knowledge **explicitly** taught in your curriculum?			Yes	No
Score range	Sub-score	Skill/knowledge	If "yes," in which course(s)/grade level(s) is this skill/knowledge explicitly taught? When are students expected to demonstrate proficiency?	
20–24	PSD	Solve problems that involve percentages		
25–29	PSD	Solve multistep problems using percentages		
30–34	PSD	Solve multistep problems involving interpretation of a constant rate of change associated with a percent increase or a percent decrease		
35–40	PSD	*Students scoring in this range consistently demonstrate attainment of these content descriptions*		
Notes				

SAT Math Test Academic Skills and Knowledge
This area focuses on **one-variable data: distributions and measures of center and spread**.

Content Description: The student will:

1. Choose an appropriate graphical representation for a given data set.
2. Interpret information from a given representation of data in context.
3. Analyze and interpret numerical data distributions represented with frequency tables, histograms, dot plots, and boxplots.
4. For quantitative variables, calculate, compare, and interpret mean, median, and range. Interpret (but don't calculate) standard deviation.
5. Compare distributions using measures of center and spread, including distributions with different means and the same standard deviations and ones with the same mean and different standard deviations.
6. Understand and describe the effect of outliers on mean and median.
7. Given an appropriate data set, calculate the mean.

Is this skill/knowledge **explicitly** taught in your curriculum?			Yes	No
Score range	Sub-score	Skill/knowledge	If "yes," in which course(s)/grade level(s) is this skill/knowledge explicitly taught? When are students expected to demonstrate proficiency?	
20–24	HOA	*Students scoring in this range are not able to demonstrate consistent attainment of these content descriptions*		
25–29	HOA	Calculate mean, median, or range for a set of data presented in various ways		
30–34	HOA	For a set of data, calculate, compare, and interpret mean, median, or range in context		
35–40	HOA	Find how the mean, median, and range of data are affected by a change in the data set Find the median of data from a frequency table Compare measures of center and spread of two data distributions represented visually		
Notes				

SAT Math Test Academic Skills and Knowledge
This area focuses on **two-variable data: models and scatterplots**.

Content Description: The student will:

1. Using a model that fits the data in a scatterplot, compare values predicted by the model to values given in the data set.
2. Interpret the slope and intercepts of the line of best fit in context.
3. Given a relationship between two quantities, read and interpret graphs and tables modeling the relationship.
4. Analyze and interpret data represented in a scatterplot or line graph; fit linear, quadratic, and exponential models.
5. Select a graph that represents a context, identify a value on a graph, or interpret information on the graph.
6. For a given function type (linear, quadratic, exponential), choose the function of that type that best fits given data.
7. Compare linear and exponential growth.
8. Estimate the line of best fit for a given scatterplot; use the line to make predictions.

Is this skill/knowledge **explicitly** taught in your curriculum?			Yes	No
Score range	Sub-score	Skill/knowledge	If "yes," in which course(s)/grade level(s) is this skill/knowledge explicitly taught? When are students expected to demonstrate proficiency?	
15–19	PSD	Read information presented in simple tables of simple graphs		
20–24	PSD	Read and interpret contextual information presented in a graph or table Identify the shape of a graph from a verbal description of some of its points Use information about a directly proportional relationship to describe the graph of the relationship		
25–29	PSD	Interpret the association shown by a scatterplot and, when applicable, use a line of best fit to make prediction Identify a graph of a nonlinear relationship between two variables based on a verbal description Evaluate a conclusion about information presented in a graph Recognize common characteristics of linear or exponential models based on a verbal description of a situation		

30–34	PSD	Analyze data presented in a scatterplot and draw conclusions from the trend shown Identify the equation of a line that best fits the data in a scatterplot Identify an appropriate inference or conclusion based on information from a graph or table Distinguish between linear and exponential models from information provided verbally or in tables	
35–40	PSD	Analyze complex data displays Analyze graphs of nonlinear relationships between two quantities, including relationships that are not represented by a linear, quadratic, or exponential equation Use scatterplots to make predictions	
Notes			

SAT Math Test Academic Skills and Knowledge
This area focuses on **probability and conditional probability**.

Content Description: The student will:

1. Compute and interpret probability and conditional probability in simple contexts.
2. Understand formulas for probability and conditional probability in terms of frequency.

Is this skill/knowledge **explicitly** taught in your curriculum?			Yes	No
Score range	Sub-score	Skill/knowledge	If "yes," in which course(s)/grade level(s) is this skill/knowledge explicitly taught? When are students expected to demonstrate proficiency?	
20–24	PSD	*Students scoring in this range are not able to demonstrate consistent attainment of these content descriptions*		
25–29	PSD	Calculate a simple conditional probability from a two-way table		
30–34	PSD	Compute conditional probability in different settings, including two-way tables		
35–40	PSD	*Students scoring in this range consistently demonstrate attainment of these content descriptions*		
Notes				

SAT Math Test Academic Skills and Knowledge
This area focuses on **inference from sample statistics and margin of error.**

Content Description: The student will:
1. Use sample mean and sample proportion to estimate population mean and population proportion. Utilize, but do not calculate, margin of error.
2. Interpret margin of error; understand that a larger sample size generally leads to a smaller margin of error.

Is this skill/knowledge **explicitly** taught in your curriculum?			Yes	No
Score range	Sub-score	Skill/knowledge	If "yes," in which course(s)/grade level(s) is this skill/knowledge explicitly taught? When are students expected to demonstrate proficiency?	
20–24	PSD	*Students scoring in this range are not able to demonstrate consistent attainment of these content descriptions*		
25–29	PSD	Use sample proportion to estimate the proportion of the population from which the sample was selected Evaluate a conclusion about the plausible values of a population proportion based on sample data and margin of error		
30–34	PSD	Understand sampling variability when the population proportion is estimated using sample data		
35–40	PSD	*Students scoring in this range consistently demonstrate attainment of these content descriptions*		
Notes				

SAT Math Test Academic Skills and Knowledge
This area focuses on **evaluating statistical claims: observational studies and experiments**.

Content Description: The student will:

1. With random samples, describe which population the results can be extended to.
2. Given a description of a study with or without random assignment, determine whether there is evidence for a causal relationship.
3. Understand why random assignment provides evidence for a causal relationship.
4. Understand why a result can be extended only to the population from which the sample was selected.

Is this skill/knowledge **explicitly** taught in your curriculum?			Yes	No
Score range	Sub-score	Skill/knowledge	If "yes," in which course(s)/grade level(s) is this skill/knowledge explicitly taught? When are students expected to demonstrate proficiency?	
20–24	PSD	*Students scoring in this range are not able to demonstrate consistent attainment of these content descriptions*		
25–29	PSD	Identify bias that may arise from sampling methods		
30–34	PSD	Identify the most appropriate sample or sampling method to best answer the question of interest Identify the population to which the results of a survey can be generalized		
35–40	PSD	Identify the appropriate conclusion to draw from a description of a study's design and the study results		
Notes				

| | | SAT Math Test Academic Skills and Knowledge
This area focuses on **equivalent expressions**. | |

Content Description: The student will:
1. Make strategic use of algebraic structure and the properties of operations to identify and create equivalent expressions, including
   a. rewriting simple rational expressions;
   b. rewriting expressions with rational exponents and radicals;
   c. factoring polynomials.
2. Fluently add, subtract, and multiply polynomials.

Is this skill/knowledge **explicitly** taught in your curriculum?			Yes	No
Score range	Sub-score	Skill/knowledge	If "yes," in which course(s)/grade level(s) is this skill/knowledge explicitly taught? When are students expected to demonstrate proficiency?	
20–24	PAM	Use the distributive property to multiply a polynomial by either a constant or a monomial, and then combine like terms		
25–29	PAM	Factor a monomial from a polynomial expression Factor a trinomial into two binomials Add and subtract polynomials in one variable Multiply two binomial expressions		
30–34	PAM	Use properties of radicals and exponents to rewrite simple expressions Use properties of rational expressions to rewrite simple expression Add, subtract, and multiply polynomials, using insight into the structure of the polynomial		
35–40	PAM	Use properties of radicals and exponents to rewrite expressions Rewrite rational expressions, utilizing insight to recognize appropriate algebraic operations Factor complicated polynomial expressions using the structure of the polynomial and strategies such as repeated factoring, difference of squares, and factoring by parts		
Notes				

SAT Math Test Academic Skills and Knowledge
This area focuses on **nonlinear equations in one variable and systems of equations in two variables**.

Content Description: The student will:

1. Make strategic use of algebraic structure, the properties of operations, and reasoning about equality to
   a. solve quadratic equations in one variable presented in a wide variety of forms; determine the conditions under which a quadratic equation has no real solutions, one real solution, or two real solutions;
   b. solve simple rational and radical equations in one variable;
   c. identify when the procedures used to solve a simple rational or radical equation in one variable lead to an equation with solutions that do not satisfy the original equation (extraneous solutions);
   d. solve polynomial equations in one variable that are written in factored form;
   e. solve linear absolute value equations in one variable;
   f. solve systems of linear and nonlinear equations in two variables, including relating the solutions to the graphs of the equations in the system.
2. Given a nonlinear equation in one variable that represents a context, interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage.
3. Given an equation or formula in two or more variables that represents a context, view it as an equation in a single variable of interest where the other variables are parameters and solve for the variable of interest.
4. Fluently solve quadratic equations in one variable, written as a quadratic expression in standard form equal to zero, where using the quadratic formula or completing the square is the most efficient method for solving the equation.

Is this skill/knowledge **explicitly** taught in your curriculum?			Yes	No
Score range	Sub-score	Skill/knowledge	If "yes," in which course(s)/grade level(s) is this skill/knowledge explicitly taught? When are students expected to demonstrate proficiency?	
20–24	PAM	*Students scoring in this range are not able to demonstrate consistent attainment of these content descriptions*		
25–29	PAM	Solve a quadratic equation in the form $x^2 + bx + c = 0$ by factoring or by using the quadratic formula. Solve a quadratic equation in the form $ax^2 = b$ Solve two- and three-step radical equations in one variable Rearrange a multivariate equation to isolate a variable or term		

30–34	PAM	Solve multistep quadratic equations Solve radical equations using the structure of the equation to reduce the number of algebraic steps Solve rational equations using the structure of the equation to reduce the number of algebraic steps Solve a system of equations consisting of one linear equation and one quadratic equation algebraically Rearrange a multivariable equation using multiple algebraic steps to isolate a term	
35–40	PAM	Solve quadratic, radical, and rational equations with multiple steps, where using insight into the structure of the equation provides an advantage Determine the conditions under which a quadratic equation has zero, one, or two solutions	
Notes			

SAT Math Test Academic Skills and Knowledge
This area focuses on **nonlinear functions**.

Content Description: The student will:
1. Create and use quadratic or exponential functions to solve problems in a variety of contexts.
2. For a quadratic or exponential function,
   a. identify or create an appropriate function to model a relationship between quantities;
   b. use function notation to represent and interpret input/output pairs in terms of a context and points on the graph;
   c. for a function that represents a context, interpret the meaning of an input/output pair, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage;
   d. determine the most suitable form of the expression representing the output of the function to display key features of the context, including
      i. selecting the form of a quadratic that displays the initial value, the zeros, or the extreme value;
      ii. selecting the form of an exponential that displays the initial value, the end-behavior (for exponential decay), or the doubling or halving time;
   e. make connections between tabular, algebraic, and graphical representations of the function by
      i. given one representation, selecting another representation;
      ii. identifying features of one representation given another representation, including maximum and minimum values of the function;
      iii. determining how a graph is affected by a change to its equation, including a vertical shift or scaling of the graph.
3. For a factorable or factored polynomial or simple rational function,
   a. use function notation to represent and interpret input/output pairs in terms of a context and points on the graph;
   b. understand and use the fact that for the graph of $y = f(x)$, the solutions to $f(x) = 0$ correspond to x-intercepts of the graph and $f(0)$ corresponds to the y-intercept of the graph; interpret these key features in terms of a context;
   c. identify the graph given an algebraic representation of the function and an algebraic representation given the graph (with or without a context).

Is this skill/knowledge **explicitly** taught in your curriculum?			Yes	No
Score range	Sub-score	Skill/knowledge	If "yes," in which course(s)/grade level(s) is this skill/knowledge explicitly taught? When are students expected to demonstrate proficiency?	
20–24	PAM	*Students scoring in this range are not able to demonstrate consistent attainment of these content descriptions*		
25–29	PAM	Interpret a constant, variable, term, solution, or input-output pair in a quadratic or exponential function in terms of the context		

		Use function notation to represent and calculate the output from a given input for nonlinear functions	
30–34	PAM	For a quadratic or exponential function, make connections between the properties of a function, an algebraic representation of the function, a graph of the function, or a table of values that satisfy the function Make connections between the graphs of polynomial functions and their equations by examining the zeros of the graph and the factors of the polynomial	
35–40	PAM	Make connections between the graph and solution to a quadratic and linear system of equations Create, or create and use a quadratic or exponential function to represent a relationship between two quantities in a real-world context Given a graph of a quadratic or exponential function representing a context, interpret a value, variable, point, or input-output pair in terms of the context For a quadratic or exponential function, make connections between the properties of a function, an algebraic representation of the function, or a graph of the function Make connections between the graphs of polynomial functions and their equations by examining the zeros and end behavior of the graph and the factors of the polynomial	
Notes			

SAT Math Test Academic Skills and Knowledge
This area focuses on **area and volume**.

Content Description: The student will:

1. Solve real-world and mathematical problems about a geometric figure or an object that can be modeled by a geometric figure using given information such as length, area, surface area, or volume.
    a. Apply knowledge that changing by a scale factor of k changes all lengths by a factor of k, changes all areas by a factor of k^2, and changes all volumes by a factor of k^3.
    b. Demonstrate procedural fluency by selecting the correct area or volume formula and correctly calculating a specified value.

Is this skill/knowledge **explicitly** taught in your curriculum?			Yes	No
Score range	Sub-score	Skill/knowledge	If "yes," in which course(s)/grade level(s) is this skill/knowledge explicitly taught? When are students expected to demonstrate proficiency?	
15–19		Solve problems using area and volume formulas		
20–24		Solve moderately difficult problems using area and volume formulas		
25–29		Solve very difficult problems using area and volume formulas		
30–34		Solve real-world problems using area and volume formulas, including formulas for circular cylinders and spheres		
35–40		Solve area or volume problems by applying standard formulas to objects that can be modeled by rectangles, circles, triangles, right rectangular prisms, and right circular prisms		
Notes				

SAT Math Test Academic Skills and Knowledge
This area focuses on **lines, angles, and triangles**.

Content Description: The student will:
1. Use concepts and theorems relating to congruence and similarity of triangles to solve problems.
2. Determine which statements may be required to prove certain relationships or to satisfy a given theorem.
3. Apply knowledge that changing by a scale factor of k changes all lengths by a factor of k, but angle measures remain unchanged.
4. Know and directly apply relevant theorems such as
   a. the vertical angle theorem;
   b. triangle similarity and congruence criteria;
   c. triangle angle sum theorem;
   d. the relationship of angles formed when a transversal cuts parallel lines.

Is this skill/knowledge **explicitly** taught in your curriculum?			Yes	No
Score range	Sub-score	Skill/knowledge	If "yes," in which course(s)/grade level(s) is this skill/knowledge explicitly taught? When are students expected to demonstrate proficiency?	
20–24		*Students scoring in this range are not able to demonstrate consistent attainment of these content descriptions*		
25–29		Solve problems about a geometric figure using the vertical angle theorem, the triangle angle sum theorem, or theorems about a transversal crossing parallel lines		
30–34		Solve problems using properties of similar triangles Solve problems using multiple theorems related to lines, angles, or triangles, including the vertical angle theorem, angle bisector theorem, or theorems about a transversal crossing parallel lines		
35–40		Apply properties of similar triangles as well as theorems related to lines, angles, and triangles to solve problems		
Notes				

SAT Math Test Academic Skills and Knowledge
This area focuses on **right triangles and trigonometry**.

Content Description: The student will:
1. Solve problems in a variety of contexts using
    a. the Pythagorean theorem;
    b. right triangle trigonometry;
    c. properties of special right triangles.
2. Use similarity to calculate values of sine, cosine, and tangent.
3. Understand that when given one side length and one acute angle measure in a right triangle, the remaining values can be determined.
4. Solve problems using the relationship between sine and cosine of complementary angles.
5. Fluently apply properties of special right triangles to determine side lengths and calculate trigonometric ratios of 30, 45, and 60 degrees.

Is this skill/knowledge **explicitly** taught in your curriculum?			Yes	No
Score range	Sub-score	Skill/knowledge	If "yes," in which course(s)/grade level(s) is this skill/knowledge explicitly taught? When are students expected to demonstrate proficiency?	
20–24		*Students scoring in this range are not able to demonstrate consistent attainment of these content descriptions*		
25–29		*Students scoring in this range are not able to demonstrate consistent attainment of these content descriptions*		
30–34		Solve real-world problems using the Pythagorean theorem Solve problems using properties of special right triangles Calculate values of sine, cosine, and tangent for right triangles		
35–40		Solve problems using properties of special right triangles, the Pythagorean theorem, and trigonometric ratios Solve problems using the relationship between sine and cosine of complementary angles		
Notes				

SAT Math Test Academic Skills and Knowledge
This area focuses on **circles**.

Content Description: The student will:

1. Use definitions, properties, and theorems relating to circles and parts of circles, such as radii, diameters, tangents, angles, arcs, arc lengths, and sector areas, to solve problems.
2. Solve problems using
   a. a. radian measure;
   b. b. trigonometric ratios in the unit circle.
3. Create an equation to represent a circle in the *xy*-plane.
4. Describe how
   a. a change to the equation representing a circle in the *xy*-plane affects the graph of the circle;
   b. a change in the graph of the circle affects the equation of the circle.
5. Understand that the ordered pairs that satisfy an equation of the form $(x - h)^2 + (y - k)^2 = r^2$ form a circle when plotted in the *xy*-plane.
6. Convert between angle measures in degrees and radians.
7. Complete the square in an equation representing a circle to determine properties of the circle when it is graphed in the *xy*-plane, and use the distance formula in problems related to circles.

Is this skill/knowledge **explicitly** taught in your curriculum?			Yes	No
Score range	Sub-score	Skill/knowledge	If "yes," in which course(s)/grade level(s) is this skill/knowledge explicitly taught? When are students expected to demonstrate proficiency?	
20–24		*Students scoring in this range are not able to demonstrate consistent attainment of these content descriptions*		
25–29		*Students scoring in this range are not able to demonstrate consistent attainment of these content descriptions*		
30–34		Make connections between the equation of a circle in the *xy*-plane and the center and radius of the circle		
35–40		Convert between radians and degree Solve problems using properties and theorems relating to circles and parts of circles, such as radii, diameters, tangents, angles, arcs, arc length, and sector area Find the diameter, radius, center, or points on a circle in the *xy*-plane given the equation of the circle		
Notes				

SAT Math Test Academic Skills and Knowledge
This area focuses on **complex numbers**.

Content Description: The student will:

1. Apply knowledge and understanding of the complex number system to add, subtract, multiply, and divide with complex numbers and solve problems.

Is this skill/knowledge **explicitly** taught in your curriculum?			Yes	No
Score range	Sub-score	Skill/knowledge	If "yes," in which course(s)/grade level(s) is this skill/knowledge explicitly taught? When are students expected to demonstrate proficiency?	
20–24		*Students scoring in this range are not able to demonstrate consistent attainment of these content descriptions*		
25–29		Add and subtract complex numbers		
30–34		Add and subtract multiple complex numbers, simplifying i^n where n is greater than 1		
35–40		Multiply complex numbers		
Notes				

Skill to Develop	Strategy	Implementation Timeline	Resource(s) Needed