SAN LEANDRO UNIFIED SCHOOL DISTRICT
COURSE PROPOSAL: Course of Study
SECTION A. COVER PAGE

1. **Course Title: Accelerated Math 8B/Algebra 1**	7. **Action** ☑ New Course ▢ Course Revision ▢ Title Change Only
2. Date Submitted:	8. **Grade Level**(s) ▢ 6 ▢9 ▢11 ▢ 7 ▢10 ▢12 ☑ 8
3. Transcript Title/Abbreviation(s) **Math 8B/Algebra 1**	**9. Prerequisites** (Please list.) ☑ Required: Accelerated Math 7/8A ☑ Recommended - Recommendation from 7/8A teacher
4. Transcript Course Code/Course Number :	**10. Seeking Program Distinction?** ▢ YES (Check one below.) XNO ▢Honors ▢ AP ▢Other
5. Subject Area Mathematics	11. **Is this a CTE course?** ▢ YES ☑ NO **If YES, complete Section C**
6. **Department** Mathematics	12. **Previously approved by UC?** ▢ YES ▢ NO X NA for 6th-8th Year approved Year removed
13. UC ELIGIBILITY **Already eligible?** ☑ NA for 6th-8th ▢**YES** ▢**NO** **a**▢ **b**▢ **c**▢ **d**▢ **e**▢ **f**▢ **g**▢ **Proposing eligibility?** for 6th-8th **XYES** ▢**NO** **a**▢ **b**▢ **c**X **d**▢ **e**▢ **f**▢ **g**▢ Please mark one for approved eligibility or proposed eligibility.	14. **Unit Value/Course Credit/Length of Course** ▢ 0.5 (semester or half-year X 1.0 (one year equivalent) ▢ 2.0 (two-year equivalent) ▢ Other
15. School Contact and Course Developer Name: Celine Liu Phone: 510-667-6215 Email: cliu@slusd.us Position: Coordinator of Educational Services	
16. Approval Signatures: **Approval Date:** Department Chair 6/1/21	**DISTRICT OFFICE USE ONLY** **Date approved by Board Curriculum Committee** 5/24/21

Principal:	**Date approved by Board**

SECTION B. COURSE CONTENT

17. Course Description

Accelerated Math 8B/Algebra 1 is an 8th grade course designed to address CA Common Core State Mathematics Standards of grades 8 and Algebra 1. It is a complement to and follows Accelerated Math 7/8A as part of the SLUSD Middle School Accelerated Math Pathway. The course will be taught in units designed to address, with equal intensity, conceptual understanding, procedural fluency, and application. Course topics include Linear Equations, Linear and Exponential Functions, Irrational Numbers, Polynomial and Quadratic Expressions, Equations, and Functions, Modeling with Equations and Functions, Descriptive Statistics . Upon successful completion of Accelerated Math 8B/Algebra 1, students will be prepared to enroll in Geometry.

18. Course Goals and/or Major Student Outcomes

As a result of this course, students should develop proficiency in the following critical areas of Math 8 and Algebra 1:

- Developing understanding of operations with rational numbers and working with expressions and linear equations;
- Using functions to describe and model quantitative relationships;
- Compare and contrast linear and exponential relationships and applying linear models to data that exhibit a linear trend
- Analyze, solve, and use exponential and quadratic functions using graphs as representations of functions

Course Objectives (standards)

Expressions, Equations, and Inequalities

- Represent and solve equations and inequalities graphically. [Linear and exponential; learn as general principle.]
- Reason quantitatively and use units to solve problems. [Foundation for work with expressions, equations and functions] (Algebra 1)
- Interpret the structure of expressions. expressions. [Linear, exponential, and quadratic] Write expressions in equivalent forms to solve problems . [Quadratic and exponential] (Algebra 1)
- Know and apply the properties of integer exponents to generate equivalent numerical expressions; use square root and cube root symbols to represent solutions to represent solutions to equations of the form x2 = p and x3 = p, where p is a positive rational number. Evaluate square roots of small perfect

squares and cube roots of small perfect cubes. Know that √2 is irrational. Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. Perform operations with numbers expressed in scientific notation, including problems where both decimal and scien-tific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (Math 8) Extend the properties of exponents to rational exponents. Use properties of rational and irrational numbers. (Algebra 1)

- Understand that solutions to a system of two linear equations in two variables correspond to points of intersec-tion of their graphs, because points of intersection satisfy both equations simultaneously. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. Solve real-world and mathematical problems leading to two linear equations in two variables. (Math 8) Solve systems of equations. [Linear-linear and linear-quadratic] (Algebra 1)
- Create equations that describe numbers or relationships. [Linear, quadratic, and exponential (integer inputs only). (Algebra 1)
- Understand solving equations as a process of reasoning and explain the reasoning. [Master linear; learn as general principle.] Solve equations and inequalities in one variable. [Linear inequalities; literal equations that are linear in the variables being solved for; quadratics with real solutions] (Algebra 1)

Functions

- Define, evaluate, and compare functions: Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). Interpret the equation as defining a linear function, whose graph is a straight line; give examples of func-tions that are not linear. (Math 8)
- Use functions to model relationships between quantities: Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (,) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or non-linear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally. (Math 8)
- Understand the concept of a function and use function notation. Interpret functions that arise in applications in terms of the context.

Analyze functions using different representations. Build a function that models a relationship between two quantities. Build new functions from existing functions. (Algebra 1)
- Construct and compare linear, quadratic, and exponential models and solve problems. Interpret expressions for functions in terms of the situation they model. (Algebra 1)
- Perform arithmetic operations on polynomials. [Linear and quadratic] (Algebra 1)

Statistics and Probability
- Summarize, represent, and interpret data on a single count or measurement variable.
- Summarize, represent, and interpret data on two categorical and quantitative variables. [Linear focus, discuss general principle.]
- Interpret linear models.

20. Course Outline

Unit 1: Relationships Between Quantities and Reasoning with Equations and Their Graphs

Students review solving linear equations in one variable and begin to apply graphical and algebraic methods to analyze and solve systems of linear equations in two variables. Students are introduced to nonlinear equations and their graphs. Students formalize their understanding of equivalent algebraic expressions and begin their study of polynomial expressions. Further, they learn that there are some actions that, when applied to the expressions on both sides of an equal sign, will not result in an equation with the same solution set as the original equation.

Unit 2: Descriptive Statistics

There is variability in data, and this variability often makes learning from data challenging. Students develop a set of tools for understanding and interpreting variability in data and begin to make more informed decisions from data. Students work with data distributions of various shapes, centers, and spreads. Measures of center and measures of spread are developed as ways of describing distributions. The choice of appropriate measures of center and spread is tied to distribution shape. Symmetric data distributions are summarized by the mean and mean absolute deviation, or standard deviation. The median and the interquartile range summarize data distributions that are skewed. Students calculate and interpret measures of center and spread and compare data distributions using numerical measures and visual representations.

Students build on their experience with bivariate quantitative data from Grade 8; they expand their understanding of linear relationships by connecting the data distribution to a model and informally assessing the selected model using residuals and residual plots. Students explore positive and negative linear relationships and use the correlation coefficient to describe the strength and direction of linear relationships. Students also analyze bivariate categorical data using two-way frequency tables and relative frequency tables. The possible association between two categorical variables is explored by using data summarized in a table to analyze differences in conditional relative frequencies.

Unit 3: Linear and Exponential Functions

Students define, evaluate, and compare functions and use them to model relationships between quantities (8.F.A.1, 8.F.A.2, 8.F.A.3, 8.F.B.4, 8.F.B.5). In this unit, students extend their study of functions to include function notation and the concepts of domain and range. They explore many examples of functions and their graphs, focusing on the contrast between linear and exponential functions. They interpret functions given graphically, numerically, symbolically, and verbally; translate between representations; and understand the limitations of various representations.

Unit 4: Polynomial and Quadratic Expressions, Equations, and Functions

Students begin to gain experience with square and cube roots, irrational numbers (8.NS.A.1), and expressions with integer exponents (8.EE.A.1).

In Algebra I, students have been analyzing the process of solving equations and developing fluency in writing, interpreting, and translating among various forms of linear equations (Unit 1) and linear and exponential functions (Unit 3). These experiences, combined with modeling with data (Unit 2), set the stage for Unit 4. Here, students continue to interpret expressions, create equations, rewrite equations and functions in different but equivalent forms, and graph and interpret functions using polynomial functions—more specifically quadratic functions as well as square root and cube root functions.

Unit 5: A Synthesis of Modeling with Equations and Functions

Students revisit functions to construct a function that models a linear relationship between two quantities (8.F.B.4) and to describe qualitatively the functional relationship between two quantities by analyzing a graph (8.F.B.5). In the first four units of the course, students learn to create and apply linear, quadratic, and exponential functions in addition to square and cube root functions (F-IF.C.7). In Unit 5, they synthesize what they have learned during the year by selecting the correct function type in a series of modeling problems without the benefit of a module or lesson title that includes function type to guide them in their choices. This supports the student's use of the modeling cycle, in the beginning of which they must formulate a strategy. Skills and knowledge from the previous units support the requirements of this unit, including writing, rewriting, comparing, and graphing functions (F-IF.C.7, F-IF.C.8, F-IF.C.9) and interpretation of the parameters of an equation (F-LE.B.5). Students also draw on their study of statistics in Unit 2, using graphs and functions to model a context presented with data and tables of values (S-ID.B.6). In this unit, we use the modeling cycle (see page 72 of the CCLS) as the organizing structure rather than function type.

21. Instructional Materials:

Eureka Math (Grade 8 and Algebra 1)

Supplementary materials

Savvas Algebra 1, Desmos, MARS lessons, Silicon Valley Math Initiative and Illustrative Mathematics tasks

22. Instructional Methods and/or Strategies (Key Assignments)

Accelerated Math 8B/Algebra 1 is a fast-paced and demanding course which strives to cover significant content, develop deeper mathematical understanding, and build students‘ capacity for rigorous mathematical thinking. Instructional methods are built on common core -aligned best practices with a focus on student involvement in tasks that ask them to “do” math, participate in and contribute to meaning-making and reasoning.

Instructional methods will incorporate collaborative learning structures within a problem-solving framework in order to support the 3 components of rigor associated with the CA Common Core State Standards for Mathematics (conceptual understanding; procedural fluency; and application). Whole group direct instruction will be supplemented with small group instruction based on assessment data (such as STAR Math), along with incorporation of technology platforms (ex: Desmos, the graphing platform used on the Smarter Balanced Assessment) to provide individualized learning pathways for students based on their demonstrated understanding and needs.

23. Assessment Methods and/or Tools

Students will be assessed with classroom quizzes and tests, rich math tasks, and district benchmarks.

24. Grading Policy

Grading will follow the San Leandro Unified School District’s policy.

Suggestions of grading are that math should be graded based on mastery of standards. In traditional grading, students are measured by the percentage of work successfully completed with the assumption that a higher completion rate reflects greater mastery. However, this does not reflect students’ growth as students and in understanding over time. While we work within a traditional grading system, teachers are encouraged to incorporate precepts of a mastery based mindset into their grading policy.

Examples of ways to incorporate grading for mastery include:
- spiraling assessment
- providing a variety of methods to demonstrate understanding
- allowing students to choose between methods of demonstrating understanding
- having a later assessment, when student demonstrates understanding of more complex concepts to count more than an earlier grade
- weighing performance in the second quarter of a semester more than the work in the first quarter
- offering retakes of assessments, after a student has demonstrated work to address misunderstandings
- providing feedback on homework, classwork and participation and having these categories make a positive contribution