SECONDARY COURSE DESCRIPTION

SECTION A: COURSE CLASSIFICATION

ALAMEDA UNIFIED SCHOOL DISTRICT
Excellence & Equity For All Students

1. Course Title: Integrated Math 1 MS	6. Prerequisite(s): none
2. Action: _x__ New Course (replacing Algebra 1) ___ Course Revision ___ Title Change Only	7. Grade Level: 8
3. Transcript Title/Abbreviation: **Integrated Math 1** (For Educational Services)	8. Elective/Required: Required
4. Transcript Course Code/Course Number: MICH (For Educational Services)	9. Subject Area: C. Mathematics
5. CBEDS Code: 9241 (For Educational Services)	10. Department: Mathematics

11. Length /Credits:
___ 0.5 (half year or semester equivalent) __x_ 1.0 (one year equivalent)
___ 2.0 (two year equivalent)

12. Was this course previously approved by UC? ___Yes _x__ No
If so, year removed from list: ____________

13. Meets the "____C___" requirements in the a-g university/college entrance requirement. Approval date: _approved May 21, 2024__-

14. School Contact Information
Name: ______________________ Title/Position: ______________________
Phone: ______________________ Fax: ______________________
E-Mail: ______________________

15. Signatures:
Department Chair: Lise Needham
Lise Needham (May 21, 2024 17:31 PDT)

Principal: ______________________

Acknowledged by Other Principals:
Kirstin Snyder (May 22, 2024 13:50 PDT)
Kai Dwyer
Kai Dwyer (May 21, 2024 17:58 PDT)
Tracy Corbally
Tracy Corbally (May 22, 2024 ... PDT)

Educational Services: ______________________

16. BOE Approval
Signature of Superintendent: ______________________ Date of Approval______________

SECTION B. COURSE CONTENT

17. Course Description:

Integrated Math 1 is the first year of the three-year sequence of mathematics courses prescribed in the California Mathematic Standards and Mathematics Framework. This course emphasizes formal development of the skills and concepts categories of Number and Quantity, Algebra, Functions, Geometry, and Statistics and Probability. It aims to deepen and extend student understanding and develop fluency with solving linear equations, inequalities, and systems. This course introduces solving of exponential equations, and explores linear and exponential functions graphically, numerically, symbolically, and as sequences, and by using regression techniques to analyze the fit of models to distributions of data. The course is balanced among procedural fluency (algorithms and basic skills), conceptual understanding, strategic competence (problem solving), and adaptive reasoning (extension and application).

18. Course Goals and/or Major Student Outcomes:

Students will use problem-solving strategies, questioning, investigating, analyzing critically, gathering and constructing evidence, and communicating rigorous arguments justifying their thinking. Under teacher guidance, students learn in collaboration with others, sharing information, ideas, and expertise.

19. Course Objectives (standards):

This course meets all of the content standards for Integrated Math 1 of the Common Core State Standards for Mathematics. The course embeds the CCSS Standards for Mathematical Practice as an integral part of the lessons in the course.

Key concepts addressed in this course include:

- Representations of linear and exponential relationships using graphs, tables, equations, and contexts.
- Symbolic manipulation of expressions in order to solve problems, such as factoring, distributing, multiplying polynomials, expanding exponential expressions, etc.
- Analysis of the slope of a line multiple ways, including graphically, numerically, contextually (as a rate of change), and algebraically.
- Solving equations and inequalities using a variety of strategies, including rewriting (such as factoring, distributing, or completing the square), undoing (such as extracting the square root or subtracting a term from both sides of an equation), and looking inside (such as determining the possible values of the argument of an absolute value expression).
- Solving systems of two equations and inequalities with two variables using a variety of strategies, both graphically and algebraically.
- Use of rigid transformations (reflection, rotation, translation) and symmetry to demonstrate congruence and develop triangle congruence theorems.
- Using coordinates to prove geometric theorems.
- Geometric constructions (with compass and straightedge).
- Simple geometric proofs (investigate patterns to make conjectures, and formally prove them).
- Representations of arithmetic and geometric sequences, including using tables, graphs, and explicit or recursive formulas.
- Use of exponential models to solve problems, and to compare to linear models.
- Use of function notation.
- Statistical analysis of two-variable data, including determining regression lines, correlation coefficients, and creating residual plots.

- The differences between association and causation, and interpretation of correlation in context.
- Comparison of distributions of one-variable data.

20. Course Outline:

Unit 1: Functions

In this unit students investigate growth patterns and characteristics of graphs of non-linear functions. The unit focuses on describing both linear and non-linear functions. Students will also work on rewriting expressions involving exponents in more useful forms.

Students will learn to:

- Consider inputs and outputs for various composite functions.
- Collect and analyze data in tables and graphs.
- Build multiple representations of functions.
- Describe functions using function notation, domain, and range.
- Determine what makes a relation and a function.
- Rewrite expressions with exponents in equivalent forms.
- Formalize laws of exponents.

Unit 2: Linear Functions

In this unit students will investigate geometric tile patterns and make connections between the growth in the pattern to slope on a graph. Students will explore differences in slope and how different slopes appear on a graph. Students will also investigate slope as a rate of change. Students will also represent linear functions in multiple ways and learn to move back and forth between representations.

Students will learn to:

- Write linear equations for patterns.
- Calculate slope of linear functions.
- Compare slope values and their effect on graphs.
- Form equations of lines in y=mx+b.
- Calculate slope between two points.
- Connect slope and rate and understand slope and y-intercept in context.
- Convert between units of rate.
- Find the y-intercept given slope and a point.
- Write equations of lines between two points.

Unit 3: Solving and Transformations

In this unit students will learn about rigid transformations and how to use them to build new shapes and describe symmetry. Students will learn to rewrite products of polynomials using area models. Students will also gain new methods for solving different types of equations.

Students will learn to:

- Understand translations, reflections and rotations.
- Understand that slopes of perpendicular lines are opposites and reciprocals.

- Find connections between reflection symmetry and relationships in polygons.
- Build new shapes using transformations.
- Use area models to multiply polynomials and to verify distributive property.
- Use multiple ways to solve equations.
- Rewrite equivalent equations.

Unit 4: Modelling Two-Variable Data

In this unit students will learn about lines of best fit and use them to make predictions. Students will describe the association in a dependent relationship. They will use scatterplots of data to create lines and curves that model the data, and then use those models to make predictions. They will use mathematical language to describe the form, direction, strength, and outliers of an association. Students will create residuals and learn about upper and lower bounds and use technology to create least squares regression lines. Students will also be creating residuals and analyzing them to determine if models are an appropriate fit for data.

Students will learn to:

- Write equations for lines of best fit and interpret the slope and y-intercept in context.
- Calculate, interpret, and graphically represent a residual.
- Graphically determine upper and lower bounds.
- Use calculators to find least squares regression lines.

Unit 5: Sequences

In this unit students will use graphs, tables, and equations to represent growth in various contexts. Students will also investigate and create multiple representations for both arithmetic and geometric sequences. Finally, students will compare sequences and functions.

Students will learn to:

- Recognize, describe, and represent exponential growth in multiple ways.
- Generate and model data using tables, graphs, and equations.
- Identify arithmetic and geometric sequences.
- Represent and describe arithmetic sequences using correction notation and vocabulary.
- Write sequences from recursive equations and write recursive equations for arithmetic sequences.
- Compare growth in linear and exponential tables.
- Find equations for geometric sequences and see connections to exponential functions.
- Use geometric sequences to solve problems involving percent increase and decrease.
- Recognize that all sequences are functions with domains limited to non-negative integers.
- Solve exponential equations graphically.

Unit 6: Systems of Equations

In this unit students will learn three algebraic methods to solve systems of equations written in different forms and develop a better understanding of what a solution is by investigating real world situations. Students will learn how infinite and no solution are represented in tables, graphs, and situations. Students will develop strategies to choose the most efficient method to solve a system.

Students will learn to:

- Solve multi-variable equations.

- Solve word problems using different representations.
- Solve word problems by writing equations.
- Solve systems of equations using the substitution method.
- Solve systems of equations using the Elimination method.
- Solve systems of equations by graphing and interpret solution in context.
- Choose a strategy for solving systems.

Unit 7: Congruence and Coordinate Geometry

In this unit students will review what they know about transformations and triangle similarity and develop strategies for proving triangle congruence without first proving similarity. Students will explore quadrilaterals and coordinate geometry, and prove congruence via rigid transformations, reflections, rotations, and translations.

Students will learn to:

- Define congruence and conditions for triangle congruence.
- Create flowcharts to justify triangle congruence.
- Prove congruence through rigid transformations.
- Investigate and identify quadrilaterals on a coordinate grid.
- Understand coordinate geometry and finding midpoints.

Unit 8: Exponential Functions

In this unit students will learn to recognize exponential growth in various representations and extend their understanding of exponents and their properties. They will learn about the family of exponential functions, and build more advanced algebra skills, such as writing the equation of an exponential function that passes exactly through any pair of given points. Students will apply their knowledge of exponential functions to real-life growth and decay problems and will learn to solve systems of exponential equations.

Students will learn to:

- Find connections between multiple representations of exponential functions.
- Generalize the roles of a and b for the equation $y = ab^x$.
- Understand the relationship between simple and compound interest.
- Represent exponential decay in multiple ways.
- Write equations from graphs of exponential functions.
- Find linear functions and exponential equations of the form $y = ab^x$given two points.
- Solve a system of exponential equations graphically.

Unit 9: Inequalities

In this unit students learn about linear inequalities and systems of inequalities. Students will learn to graph systems of inequalities and apply this skill in solving real-world problems. They will develop ways to represent solutions to inequalities both algebraically and graphically for situations involving one variable, two variables, and systems. Students will learn how to write mathematical constraints for situations, and learn how to solve equations and inequalities involving absolute value.

Students will learn to:

- Solve single variable linear inequalities and graph the solutions.
- Solve equations and inequalities involving absolute value.

- Graph multi-variable linear and nonlinear inequalities and systems of inequalities.
- Apply inequalities to solve problems.

Unit 10: Functions and Data

In this unit, students work with two-way tables to determine the association of categorical data. They review the ways to graphically show data and decide whether or not to use scatterplots or two histograms to compare two variables. They use descriptive statistics to compare two sets of data with the center, shape, spread, and outliers. Then they learn how to describe the variability (the spread) in data with standard deviation.

In this unit students learn about transforming linear and exponential functions, learn to compare distributions, and develop a new way to describe distributions.

Students will learn to:

- Transform linear and exponential functions by multiplying by a constant.
- Compare data representations using the center, shape, spread, and outliers.
- Describe data sets using standard deviation.

21. Instructional Materials:

Board approved required text:

Core Connections Integrate 1: Authors: Dietiker, Baldinger, Kassarjian; Publisher: CPM

Supplementary materials:

Delta Math

22. Instructional Methods and/or Strategies

A variety of instructional strategies will be used within each unit. The students will be given investigation activities to explore new material and make their own predictions. There will be a combination of direction instruction, modeling, guided practice, whole class and small group discussion, collaborative activities, and independent work. Most of each day will involve students working on a task collaboratively with other students. Study team strategies suggested in the CPM curriculum will be used. Instructional methods will support one or more of the Standards for Mathematical Practice.

Class work is designed to have students working cooperatively or individually every day. The lessons involve opportunities for students to make sense of problems and persevere in solving them, reason abstractly and quantitatively, construct viable arguments and critique the reasoning of others, model with mathematics, use appropriate tools strategically, attend to precision, look for and make use of structure, and look for and express regularity in repeated reasoning. Students will share their mathematical thinking and develop their ability to think critically, and problem solve. Students will daily use at least one of the eight Standards of Mathematical Practice.

23. Assessment and Evaluation

There will be various assessments, including 1 - 3 small formative assessments, a team practice test and a cumulative summative individual assessment for each unit. There will be a cumulative comprehensive final exam at the end of each semester.

24. Grading Policy

Students will be assessed regularly, and grades will reflect mastery of content standards per board policy.