Approved by

Board of Trustees

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SAN MATEO UNION HIGH SCHOOL DISTRICT

INTEGRATED MATH 1-2

I. Description of the Course

A. Purpose

This class is designed to provide a balance of problem solving, skill development, and conceptual understanding. The course is based on strengthening algebraic skills while introducing geometric skills.

B. Grade Placement:

10^{th}-11^{th} grade

C. Prerequisites:

D or better in Algebra 1-2 or recommendation of teacher

D. Credit

10.0 credits of mathematics

II. Topics of the Course

A. Exploring and Communicating Mathematics
B. Using Measurement and Equations
C. Representing Data
D. Coordinates and Functions
E. Equations for Problem Solving
F. Ratios, Probability, and Similarity
G. Direct Variation
H. Linear Equations as Models
I. Reasoning and Measurement
J. Quadratic Equations as Models

III. Content Standards

A. Exploring and Communicating Mathematics

1) Students use properties of numbers to demonstrate whether assertions are true or false. **(A1.1)**

2) Students add, subtract, multiply, and divide monomials and polynomials. Students solve multi-step problems, including word problems, by using these techniques. **(A10)**

3) Students simplify fractions with polynomials in the numerator and denominator by factoring both and reducing them to the lowest terms. **(A12)**

4) Students prove that triangles are congruent or similar, and they are able to use the concept of corresponding parts of congruent triangles. **(G5)**

B. Using Measurement and Equations

1) Students find and use measures of sides and of interior and exterior angles of triangles and polygons to classify figures and solve problems. **(G12)**

C. Representing Data

1) Students know the definitions of the mean, median, and mode of a distribution of data and can compute each in particular situations. **(PS6)**

2) Students organize and describe distributions of data by using a number of different methods, including frequency tables, histograms, standard line and bar graphs, stem-and-leaf displays, scatter plots, and box-and-whisker plots. **(PS8)**

3) Students solve problems involving basic probability problems. **(PS10)**

D. Coordinates and Functions

1) Students prove theorems by using coordinate geometry, including the midpoint of a line segment, the distance formula, and various forms of equations of lines and circles. **(G17)**

2) Students know the effect of rigid motions on figures in the coordinate plane and space, including rotations, translations, and reflections. **(G22)**

E. Equations for Problem Solving

1) Students will understand and use such operations as taking the opposite, finding the reciprocal, taking a root and raising to a fractional power. They understand and use the rules of exponents. **(A2)**

2) Students simplify expressions prior to solving linear equations and inequalities in one variable such as $3(2x-5) + 4(x-2) = 12$. **(A4)**

3) Students solve multi-step problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step. **(A5)**

F. Ratios, Probability, and Similarity

1) Students prove basic theorems involving congruence and similarity. **(G14)**

2) Students use trigonometric functions to solve for an unknown length of a side of a right triangle, given an angle and a length of a side. **(G19)**

G. Direct Variation

1) Students know, derive, and solve problems involving the perimeter, circumference, area, volume, lateral area, and surface area of common geometric figures. **(G8)**

H. Linear Equations as Models

1) Students graph a linear equation, and compute the x- and y- intercepts (e.g., graph $2x + 6y = 4$). They are also able to sketch the region defined by linear inequality (e.g., they sketch the region defined by $2x + 6y < 4$). **(A6)**

2) Students verify that a point lies on a line given an equation of the line. Students are able to derive linear equations by using the point-slope formula. **(A7)**

3) Students understand the concepts of parallel lines and perpendicular lines and how those slopes are related. Students are able to find the equation of a line perpendicular to a given line that passes through a given point. **(A8)**

4) Students solve a system of two linear equations in two variables algebraically and are able to interpret the answer graphically. Students are able to solve a system of two linear inequalities in two variables and to sketch the solution sets. **(A9)**

I. Reasoning and Measurement

1) Students use properties of numbers to construct simple, valid arguments (direct and indirect) for, or formulate counterexamples to, claimed assertions. **(A25.1)**

2) Students judge the validity of an argument according to whether the properties of the real number system and the order of operations have been applied correctly at each step. **(A25.2)**

3) Students compute the volumes and surface areas of prisms, pyramids, cylinders, cones, and spheres; and students commit to memory the formulas for prisms, pyramids, and cylinders. **(G9)**

4) Students compute areas of polygons, including rectangles, scalene triangles, equilateral triangles, rhombi, parallelograms, and trapezoids. **(G10)**

5) Students determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures and solids. **(G11)**

6) Students find and use measures of sides and of interior and exterior angles of triangles and polygons to classify figures and solve problems. **(G12)**

7) Students use the Pythagorean theorem to determine distance and find missing lengths of sides of right triangles. **(G15)**

J. Quadratic Equations as Models

1) Students apply basic factoring techniques to second- and simple third-degree polynomials. These techniques include finding a common factor for all terms in a polynomial, recognizing the difference of two squares, and recognizing perfect squares of binomials. **(A11)**

2) Students solve a quadratic equation by factoring or completing the square. **(A14)**

3) Students know the quadratic formula and are familiar with its proof by completing the square. **(A19)**

4) Students use the quadratic formula to find the roots of a second-degree polynomial and to solve quadratic equations. **(A20)**

IV. Skill Objectives

Students will

A. Estimate reasonable solutions.
B. Master a variety of problem-solving skills and choose appropriately from them.
C. Use the appropriate technology.
D. Work collaboratively.
E. Use appropriate mathematical vocabulary and terminology.
F. Collect and organize resources.
G. Express thinking both orally and in writing.