

FOLSOM CORDOVA UNIFIED SCHOOL DISTRICT

Integrated Math 2

Date: November 2014

Proposed Grade Level(s): 9th-12th

Grading: A-F

Prerequisites: “C-” or better in Integrated Math 1

Subject Area: Mathematics

Course Length: One year

Number of Credits: 5 per semester

COURSE DESCRIPTION:

Integrated Math 2 is designed to extend the mathematics that students learned in Integrated Math 1 to the family of quadratic expressions, equations, and functions. The standards are based on the Common Core State Standards for Mathematics and include topics from the conceptual categories: Number and Quantity, Algebra, Functions, Geometry, and Statistics and Probability. Instructional time will focus on five critical areas: (1) extend the laws of exponents to rational exponents; (2) compare key characteristics of quadratic functions with those of linear and exponential functions; (3) create and solve equations and inequalities involving linear, exponential and quadratic expressions; (4) extend work with probability; and (5) establish criteria for similarity of triangles based on dilations and proportional reasoning.

GENERAL GOALS/PURPOSES:

As stated in the *Mathematics Framework (2013)*, the focus of Integrated Math 2 is on quadratic expressions, equations, and functions, and comparing their characteristics and behavior to those of linear and exponential relationships learned in Integrated Math 1. The link between data is explored through conditional probability and counting methods, including their use in making and evaluating decisions. The study of similarity leads to an understanding of right triangle trigonometry and circles, with their quadratic algebraic representations, round out the course. The courses in the Integrated Pathway follow the structure began in the K-8 standards of presenting mathematics as a coherent subject, mixing standards from various conceptual categories.

CCSS STUDENT READING/WRITING/SPEAKING and LISTENING COMPONENTS:

The eight *Standards for Mathematical Practice* describe the attributes of mathematically proficient students and expertise that mathematics educators at all levels should seek to develop in their students. Mathematical practices provide a vehicle through which students engage with and learn mathematics – with a heavy focus on reading, writing, and explaining.

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

TEXTBOOKS AND RESOURCE MATERIALS:

Integrated Math II, A Common Core Math Program; Carnegie Learning, 2013

DETAILED UNITS OF INSTRUCTION:

Chapters	Standards	Chapter Overview
1: Tools of Geometry	G.CO.1 G.CO.2 G.CO.4 G.CO.5 G.CO.6 G.CO.12 G.CO.13 G.MG.3	This chapter begins by addressing the building blocks of geometry which are the point, the line, and the plane. Students will construct line segments, midpoints, bisectors, angles, angle bisectors, perpendicular lines, parallel lines, polygons, and points of concurrency. A translation is a rigid motion that preserves the size and shape of segments, angles, and polygons. Students use the coordinate plane and algebra to determine the characteristics of lines, segments, and points of concurrency.
2: Introduction to Proof	G.CO.9	This chapter focuses on the foundations of proof. Paragraph, two-column, construction, and flow chart proofs are presented. Proofs involving angles and parallel lines are completed.
3: Properties of Triangles	G.CO.10 G.MG.1	Theorems involving angles and side lengths of triangles are presented. The last two lessons discuss properties and theorems of 45° - 45° - 90° triangles and 30° - 60° - 90° triangles.
4: Similarity Through Transformations	G.SRT.1a G.SRT.1b G.SRT.2 G.SRT.3 G.SRT.4 G.SRT.5 G.GPE.7 G.MG.1	This chapter addresses similar triangles and establishes similar triangle theorems as well as theorems about proportionality. The chapter leads student exploration of the conditions for triangle similarity and opportunities for applications of similar triangles.
5: Congruence through Transformations	G.CO.2 G.CO.3 G.CO.5 G.CO.6 G.CO.7 G.CO.8 G.CO.9 G.CO.10 G.CO.12	This chapter focuses on proving triangle congruence theorems and using the theorems to determine whether triangles are congruent.
6: Using Congruence Theorems	G.CO.1 G.CO.6 G.CO.7 G.CO.8 G.CO.10 G.CO.12	This chapter covers triangle congruence, including right triangle and isosceles triangle congruence theorems. Lessons provide opportunities for students to explore the congruence of corresponding parts of congruent triangles as well as continuing work with proof, introducing indirect proof, or proof by contradiction. Throughout, students apply congruence theorems to solve problems.

7: Properties of Quadrilaterals	G.CO.9 G.CO.11 G.CO.12 G.SRT.8 G.MG.1	This chapter focuses on properties of squares, rectangles, parallelograms, rhombi, kites, and trapezoids. The sum of interior and exterior angles of polygons is also included.
8: Trigonometry	G.SRT.3 G.SRT.5 G.SRT.6 G.SRT.7 G.SRT.8 G.SRT.9 G.SRT.10 G.SRT.11 G.MG.1	This chapter introduces students to trigonometric ratios using right triangles. Lessons provide opportunities for students to discover and analyze these ratios and solve application problems using them. Students also explore the reciprocals of the basic trigonometric ratios sine, cosine, and tangent, along with their inverses to determine unknown angle measures. Deriving the Law of Sines and the Law of Cosines extends students' understanding of trigonometry to apply to all triangles.
9: Circles	G.CO.1 G.C.1 G.C.2 G.C.4 G.MG.1	This chapter reviews information about circles, and then focuses on angles and arcs related to a circle, chords, and tangents. Several theorems related to circles are proven throughout the chapter.
10: Arcs and Sectors of Circles	G.C.3 G.C.5 G.MG.1 G.MG.3	This chapter explores inscribed and circumscribed polygons as well as circles. Students determine relationships between central angles, arcs, arc lengths, areas of parts of circles, as well as linear velocity and angular velocity.
11: Three-Dimensional Figures	G.MG.1 G.MG.3 G.GMD.1 G.GMD.2 G.GMD.3 G.GMD.4	This chapter explores inscribed and circumscribed polygons as well as circles. Students determine relationships between central angles, arcs, arc lengths, areas of parts of circles, as well as linear velocity and angular velocity.
12: Introduction to Quadratic Functions	A.CED.1 A.CED.2 A.SSE.1 A.SSE.1a A.SSE.3a F.IF.4 F.IF.5 F.IF.6 F.IF.7a F.BF.3 F.LE.1a	This chapter examines the graphical behavior of quadratic functions, including domain, range, increasing and decreasing, absolute maximum and absolute minimum, symmetry, and zeros. The relationship between the form of a quadratic function and the graph of a quadratic function is discussed, especially the key graphical characteristics identified from the form of the quadratic function. Transformations and dilations of quadratic functions are explored.
13: Polynomials and Quadratics	A.SSE.1a A.SSE.2 A.SSE.3a A.SSE.3b	This chapter introduces operations with polynomials, including factoring quadratic trinomials. Quadratic equations are solved graphically, by factoring, and by completing the square.

	A.APR.1 A.CED.1 A.CED.2 A.REI.4b N.RN.2	
14: Solving Quadratic Equations and Inequalities	A.CED.1 A.CED.2 A.REI.4a A.REI.4b A.REI.7 F.IF.7a	This chapter introduces the quadratic formula and emphasizes choosing an appropriate method to solve quadratic equations. Quadratic inequalities are solved using a coordinate plane, and then an algebraic strategy is introduced. Systems of equations involving one or more quadratic equations are solved.
15: Real Number System	N.RN1 N.RN.2 N.RN.3 N.CN.1 N.CN.2 N.CN.7 A.REI.4b	This chapter begins by reviewing the real number system and then move to introducing the imaginary and ultimately the complex number system. Using the powers of exponents rules, students discover the necessity of the number i . This discovery leads to students exploring whether quadratic functions have one, two, or no real roots.
16: Other Functions and Inverses	F.IF.1 F.IF.2 F.IF.4 F.IF.5 F.IF.7 F.1F.7b F.BF.1a F.BF.4a F.BF.4b A.CED.1 A.CED.4	This chapter focuses on piecewise functions, absolute value functions, and step functions. Inverses of linear functions are introduced graphically, numerically, and algebraically, which is then extended to include non-linear functions.
17: Shapes on the Coordinate Plane	G.CO.1 G.MG.1 G.MG.3 G.GPE.4 G.GPE.5	This chapter focuses on piecewise functions, absolute value functions, and step functions. Inverses of linear functions are introduced graphically, numerically, and algebraically, which is then extended to include non-linear functions.
18: Circles and Parabolas	G.GPE.1 G.GPE.2 G.GPE.4 G.GPE.5 G.SRT.8 G.MG.1	This chapter explores circles, polygons, and parabolas on the coordinate plane. Key characteristics are used to write equations for these geometric figures.
19: Probability	S.CP.1 S.CP.2 S.CP.8	This chapter investigates compound probability with an emphasis toward modeling and analyzing sample spaces to determine rules for calculating probabilities in different situations. Students explore various probability models and calculate compound probabilities with

		independent and dependent events in a variety of problem situations. Students use technology to run experimental probability simulations.
20: More Probability, and Counting	S.CP.3 S.CP.4 S.CP.5 S.CP.6 S.CP.9 S.MD.6 S.MD.7	This chapter addresses more compound probability concepts and more counting strategies. Compound probability concepts are presented using two-way frequency tables, conditional probability, and independent trials. The counting strategies include permutations, permutations with repetition, circular permutations, and combinations. The last lesson focuses on geometric probability and expected value.

COMMON CORE STATE STANDARDS ADDRESSED:

The content standards addressed in this course come from each of the conceptual categories:

- Number and Quantity
- Algebra
- Functions
- Modeling
- Geometry
- Statistics and Probability

***See attachment for specific standards addressed.**

DISTRICT ESLRs TO BE ADDRESSED:

When students exit a secondary mathematics course, they will be:

- **Self-directed Learners** who will be able to use notes and a textbook to assist them in continuing their learning outside of the classroom setting.
- **Efficient Communicators** who can explain mathematical concepts to others and use mathematics to organize and explain data.
- **Quality Producers** who understand the importance of neat, organized work that demonstrates their thinking and understanding of the solution they've formed to solve a problem.
- **Constructive Thinkers** who are able to attack problems with organization, logic, and mathematical skills they've developed in a systematic fashion.
- **Collaborative Workers** who can work in a variety of settings in culturally diverse groups. They will be able to form and use study groups to strengthen their own understanding in addition to providing the same service for classmates.
- **Responsible Citizens** who accept the consequences of their actions and who demonstrate their understanding of their role in the learning process.