

Orange Unified School District  
Office of Curriculum and Instruction  
Course Description - High School

<b>Course Title</b>	Math I	<b>Course Code</b>	N249
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<b>Content Area:</b>	Math	<b>Grade Range:</b>	9-12
<b>Prerequisites:</b>	Math 8	<b>Length of Course:</b>	1 year
<b>Course Sequence:</b>	Y	<b>Next course in sequence:</b>	Math II

**Course Description:** (from California CCSS-M)

The fundamental purpose of High School Mathematics I is to formalize and extend the mathematics that students learned in the middle grades. The critical areas, organized into units, deepen and extend understanding of linear relationships, in part by contrasting them with exponential phenomena, and in part by applying linear models to data that exhibit a linear trend. Mathematics 1 uses properties and theorems involving congruent figures to deepen and extend understanding of geometric knowledge from prior grades. The final unit in the course ties together the algebraic and geometric ideas studied. The Mathematical Practice Standards apply throughout each course and, together with the content standards, prescribe that students experience mathematics as a coherent, useful, and logical subject that makes use of their ability to make sense of problem situations.

**Student Outcomes:**

**1. Extend understanding of numerical manipulation to algebraic manipulation**

In previous grades, students had a variety of experiences working with expressions and creating equations. Students become competent in algebraic manipulation in much the same way that they are with numerical manipulation. Algebraic facility includes rearranging and collecting terms, factoring, identifying and canceling common factors in rational expressions, and applying properties of exponents. Students continue this work by using quantities to model and analyze situations, to interpret expressions, and to create equations to describe situations.

**2. Synthesize understanding of function**

In earlier grades, students define, evaluate, and compare functions, and use them to model relationships among quantities. Students will learn function notation and develop the concepts of domain and range. They move beyond viewing functions as processes that take inputs and yield outputs and start viewing functions as objects in their own right. They explore many

examples of functions, including sequences; interpret functions given graphically, numerically, symbolically, and verbally; translate between representations; and understand the limitations of various representations. They work with functions given by graphs and tables, keeping in mind that, depending upon the context, these representations are likely to be approximate and incomplete. Their work includes functions that can be described or approximated by formulas as well as those that cannot. When functions describe relationships between quantities arising from a context, students reason with the units in which those quantities are measured. Students build on and informally extend their understanding of integer exponents to consider exponential functions. They compare and contrast linear and exponential functions, distinguishing between additive and multiplicative change. They interpret arithmetic sequences as linear functions and geometric sequences as exponential functions.

**3. Deepen and extend understanding of linear relationships**

In previous grades, students learned to solve linear equations in one variable and applied graphical and algebraic methods to analyze and solve systems of linear equations in two variables. Building on these earlier experiences, students analyze and explain the process of solving an equation and justify the process used in solving a system of equations. Students develop fluency in writing, interpreting, and translating among various forms of linear equations and inequalities and use them to solve problems. They master the solution of linear equations and apply related solution techniques and the laws of exponents to the creation and solution of simple exponential equations. Students explore systems of equations and inequalities, and they find and interpret their solutions. All of this work is grounded on understanding quantities and on relationships among them.

**4. Apply linear models to data that exhibit a linear trend**

Students' prior experiences with data are the basis for the more formal means of assessing how a model fits data. Students use regression techniques to describe approximately linear relationships among quantities. They use graphical representations and knowledge of the context to make judgments about the appropriateness of linear models. With linear models, they look at residuals to analyze the goodness of fit.

**5. Establish criteria for congruence based on rigid motions**

In previous grades, students were asked to draw triangles based on given measurements. They also have prior experience with rigid motions (translations, reflections, and rotations) and have used these experiences to develop notions about what it means for two objects to be congruent. Students establish triangle congruence criteria, based on analyses of rigid motions and formal constructions. They solve problems about triangles, quadrilaterals, and other polygons. They apply reasoning to complete geometric constructions and explain why they work.

**6. Apply the Pythagorean Theorem to the coordinate plane**

Building on their work with the Pythagorean Theorem in eighth grade to find distances, students use a rectangular coordinate system to verify geometric relationships, including properties of special triangles and quadrilaterals and slopes of parallel and perpendicular lines.

## **California Content Standards:**

### **Number and Quantity**

#### *Quantities (N-Q)*

- Reason quantitatively and use units to solve problems. [Foundation for work with expressions, equations, and functions]

### **Algebra**

#### *Seeing Structure in Expressions (A-SSE)*

- Interpret the structure of expressions. [Linear expressions and exponential expressions with integer exponents]

#### *Creating Equations (A-CED)*

- Create equations that describe numbers or relationships. [Linear and exponential (integer inputs only); for A.CED.3, linear only]

#### *Reasoning with Equations and Inequalities (A-REI)*

- 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.
- Solve systems of equations. [Linear systems]
- Represent and solve equations and inequalities graphically. [Linear and exponential; learn as general principle.]

### **Functions**

#### *Interpreting Functions (F-IF)*

- Understand the concept of a function and use function notation. [Learn as general principle. Focus on linear and exponential (integer domains) and on arithmetic and geometric sequences.]
- Interpret functions that arise in applications in terms of the context. [Linear and exponential (linear domain)]
- Analyze functions using different representations. [Linear and exponential]

#### *Building Functions (F-BF)*

- Build a function that models a relationship between two quantities. [For F.BF.1, 2, linear and exponential (integer inputs)]
- Build new functions from existing functions. [Linear and exponential; focus on vertical translations for exponential.]

#### *Linear, Quadratic, and Exponential Models (F-LE)*

- Construct and compare linear, quadratic, and exponential models and solve problems. [Linear and exponential]
- Interpret expressions for functions in terms of the situation they model. [Linear and exponential of form  $f(x) = b^x + k$ ]

## **Geometry**

### *Congruence (G-CO)*

- Experiment with transformations in the plane.
- Understand congruence in terms of rigid motions. [Build on rigid motions as a familiar starting point for development of concept of geometric proof.]
- Make geometric constructions. [Formalize and explain processes.]

### *Expressing Geometric Properties with Equations (G-GPE)*

- Use coordinates to prove simple geometric theorems algebraically. [Include distance formula; relate to Pythagorean Theorem.]

## **Statistics and Probability**

### *Interpreting Categorical and Quantitative Data (S-ID)*

- 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.

## **Standards for Mathematical Practice:**

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.

**District Adopted Curriculum Map for Pearson Integrated High School Mathematics I:**

Topic and Title	Number of Days	Topic and Title	Number of Days
<b>Chapter 1: Solving Equations and Inequalities</b>	<b>21-23</b>	<b>Chapter 6: Data Analysis</b>	<b>15-17</b>
Core lessons with Activity/Technology/Lesson Lab(s)	18	Core lessons with Activity/Technology/Lesson Lab(s)	12
Review, remediation, fluency practice, differentiation, and assessment	3-5	Review, remediation, fluency practice, differentiation, and assessment	3-5
<b>Chapter 2: An Introduction to Functions</b>	<b>18-20</b>	<b>Chapter 7: Tools of Geometry</b>	<b>14-16</b>
Core lessons with Activity/Technology/Lesson Lab(s)	15	Core lessons with Activity/Technology/Lesson Lab(s)	11
Review, remediation, fluency practice, differentiation, and assessment	3-5	Review, remediation, fluency practice, differentiation, and assessment	3-5
<b>Chapter 3: Linear Functions</b>	<b>17-19</b>	<b>Chapter 8: Transformations</b>	<b>13-15</b>
Core lessons with Activity/Technology/Lesson Lab(s)	14	Core lessons with Activity/Technology/Lesson Lab(s)	10
Review, remediation, fluency practice, differentiation, and assessment	3-5	Review, remediation, fluency practice, differentiation, and assessment	3-5
<b>Chapter 4: Systems of Equations and Inequalities</b>	<b>15-17</b>	<b>Chapter 9: Connecting Algebra and Geometry</b>	<b>11-13</b>
Core lessons with Activity/Technology/Lesson Lab(s)	12	Core lessons with Activity/Technology/Lesson Lab(s)	8
Review, remediation, fluency practice, differentiation, and assessment	3-5	Review, remediation, fluency practice, differentiation, and assessment	3-5
<b>Chapter 5: Exponents and Exponential Functions</b>	<b>17-19</b>	<b>Chapter 10: Reasoning and Proof</b>	<b>17-19</b>
Core lessons with Activity/Technology/Lesson Lab(s)	14	Core lessons with Activity/Technology/Lesson Lab(s)	14
Review, remediation, fluency practice, differentiation, and assessment	3-5	Review, remediation, fluency practice, differentiation, and assessment	3-5

**Textbook Resources to use:**

- Each section:
- Think About a Plan
- Activity, Games and Puzzles
- Additional Vocabulary Support
- Enrichment
- Reteaching
- Find the Errors!

**California Summative Assessment Blueprint (SBAC):**

Note: These assessment blueprints are for the summative SBAC at the end of Grade 11

Target Sampling Mathematics Grade 11						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
1. Concepts and Procedures	Priority Cluster	D. Interpret the structure of expressions.	1, 2	2	0	19-22
		E. Write expressions in equivalent forms to solve problems.	1, 2			
		F. Perform arithmetic operations on polynomials.	2	1		
		G. Create equations that describe numbers or relationships.	1, 2	4-5		
		H. Understand solving equations as a process of reasoning and explain the reasoning.	1, 2			
		I. Solve equations and inequalities in one variable.	1, 2			
		J. Represent and solve equations and inequalities graphically.	1, 2	2		
		K. Understand the concept of a function and use function notation.	1, 2	2		
		L. Interpret functions that arise in applications in terms of a context.	1, 2	3-4		
		M. Analyze functions using different representations.	1, 2, 3			
	N. Build a function that models a relationship between two quantities.	2				
	Supporting Cluster	O. Define trigonometric ratios and solve problems involving right triangles.	1, 2	2		
		P. Summarize, represent, and interpret data on a single count or measurement variable.	2	1-2		
		A. Extend the properties of exponents to rational exponents.	1, 2	1		
		B. Use properties of rational and irrational numbers.	1, 2			
C. Reason quantitatively and use units to solve problems.		1, 2	1			

**Target Sampling Mathematics Grade 11**

Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
2. Problem Solving 4. Modeling and Data Analysis	Problem Solving (drawn across content domains)	A. Apply mathematics to solve well-posed problems arising in everyday life, society, and the workplace.	2, 3	2	1-2	8-10
		B. Select and use appropriate tools strategically. C. Interpret results in the context of a situation. D. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).	1, 2, 3	1		
		Modeling and Data Analysis (drawn across content domains)	A. Apply mathematics to solve problems arising in everyday life, society, and the workplace. D. Interpret results in the context of a situation.	2, 3	1	
	B. Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem. E. Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.		2, 3, 4	1		
	C. State logical assumptions being used. F. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas). G. Identify, analyze, and synthesize relevant external resources to pose or solve problems.		1, 2, 3 3, 4	1 0		
3. Communicating Reasoning	Communicating Reasoning (drawn across content domains)	A. Test propositions or conjectures with specific examples. D. Use the technique of breaking an argument into cases.	2, 3	3	0-2	8-10
		B. Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. E. Distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in the argument—explain what it is.	2, 3, 4	3		
		C. State logical assumptions being used. F. Base arguments on concrete referents such as objects, drawings, diagrams, and actions. G. At later grades, determine conditions under which an argument does and does not apply. (For example, area increases with perimeter for squares, but not for all plane figures.)	2, 3	2		