SACRAMENTO CITY UNIFIED SCHOOL DISTRICT
BOARD OF EDUCATION

Agenda ItendtP <Reading (Act

☐ Conference/Action
☐ Action
☐ Public Hearing

Division : Curriculum and Instruction

Recommendation : Approve the courses of study for "Integrated Math 1"-M at the high school level, w
three-year period: Math 1 in 2014-15; Math 2 and
and Math 3 Plus in 2016-17.

The integrated pathway (Math 1, Math 2, and Math 3) is a sequence of courses that build upon the foundation established in elementary and middle school mathematics. These courses develop mathematics across multiple categories, including a blend of

These courses meet the University of California A – G requirements, and will prepare students for college and career opportunities upon graduation.

Financial Considerations : None

LCAP Goal(s) : College,

COURSE OF STUDY

FOR

Integrated Math 1

INTEGRATED MATH 1 1P / MIS101
INTEGRATED MATH 1 2P / MIS102
INTEGRATED MATH 1 / ZIS131
INTEGRATED MATH 1 / ZIS132

Segment	High School
Length of Course	One Year
Developed by	Math Training Specialists (lead: Jennifer Graziano)
First Edition	Spring 2016

religion, sex, sexual orientation, parental, family or marital status, or association with a person or a group with one or more of these actual or perceived characteristics.

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INTEGRATED MATHEMATICS 1

SECTION ONE — GENERAL INFORMATION

COURSE DESCRIPTION

The standards in the Integrated Mathematics I course come from the following conceptual categories: Modeling, Functions, Number and Quantity, Algebra, Geometry, and Statistics and Probability.The fundamental purpose of the Mathematics I course is to formalize and extend students' understanding of linear functions and their applications. The critical topics of study 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 I uses properties and theorems involving congruent figures to deepen and extend geometric knowledge gained in prior grade levels (From CA Framework for Mathematics I .)

RATIONALE

SCUSD has elected the integrated pathway of mathematics to implement the CCSS-M at the high school level, which will be phased in over a three-year period: Math 1 in 2014-15; Math 2 in 2015-16; and Math 3 in 2016-17.
The integrated pathway (Math 1, Math 2, and Math 3) is a sequence of courses that build upon the foundation established in elementary and middle school mathematics. These courses develop mathematics across multiple categories, including a blend of Number and Quantity, Algebra, Functions, Geometry, and Statistics and Probability concepts throughout all three courses. SCUSD currently has a graduation requirement of 2 years of math in high school, with completion of Integrated Math 2 (or equivalent course, for students who transfer from out-of-district). This course meets the University of California A – G requirements, and will prepare students for college and career opportunities upon graduation.

COURSE

- Construct and compare linear, quadratic, and exponential models and solve problems
- Interpret expressions for functions in terms of the situation they model.

Geometry

Congruence

- Experiment with transformations in the plane.
- Understand congruence in terms of rigid motions.
- Make geometric constructions.

Expressing Geometric Properties with Equations

- Use coordinates to prove simple geometric theormes algebraically.

Statistics and Probability

Interpreting Categorical and Quantitative Data

- Summarize, represent, and interpret data on a single count or measurement variable.
- Summarize, represent, and interpret data on two categorical and quantitative variables.
- Interpret linear models.

To read the descriptions of the Standards for Mathematical Practice and to read the specific Math 2 Content Standards, see the CA Framework for Mathematics I .

I

SUGGESTED AVERAGE TIME FOR COVERING MAJOR UNITS

Units	Content Standards
Unit 1: Relationships between Quantities N30 days	A.SSE.1a,b N-Q.1,2,3 A-CED.1,2,3,4
Unit 2: Linear and Exponential Relationsjips N40 days	A-REI.10 - 12 F-IF.1 – 6, 7a, 7e, 9 F-LE.1, 2, 3, 5 F-BF.1, 2, 3
Unit 3: Reasoning with Equations N25 days	A-REI.1, 3, 5, 6
Unit 4: Descriptive Statistics N35 days	S-ID.1, 2, 3, 5, 6, 7, 8, 9
Unit 5: Congruence, Proof, and Constructions N30 days	G-CO.1, 2, 3, 4, 5, 6, 7, 8, 12, 13
Unit 6: Connecting Algebra and Geometry Through Coordinates N20 days	G-GPE.4, 5, 7

TEACHER RESOURCES

- http://www.corestandards.org/
- www.walchconnect.com
- www.scusd-math.wikispaces.com/Math1
- ”

SECTION TWO — COURSE UNITS

See our SCUSD Curriculum Map for Math 1 to access links to documents, tasks, and resources related to the lessons within each unit. Our curriculum map is available here.

- From a given context, write a system of linear inequalities, graph the solution, and interpret the solution set in terms of the situation.

- Identify the parameters in a given linear or exponential equation.
- Interpret what the parameters of a linear or exponential function mean in terms of a situation that it models.

Suggested Activities

- Continue to use both tables and graphs to represent equations, so students can see and understand connections between various representations.
- Ask students: Why is the point of intersection of two graphs the solution to the system of equations?
- Provide opportunities for students to compare and contrast domain and range to build understanding of the two.
- Have students interpret their results in terms of the situation it models, when evaluating a function in a real-world context. For example:

  Situation:
  A shipping company charges $5.00 to ship a package plus an

UNIT 3: Reasoning with Equations

Students make use of properties of equality to solve linear equations and inequalities in one variable including ones with absolute values (CA added) as well as simple exponential equations of the form $b^x = c$. Students explain and justify solution methods. Students also prove equivalencies and solve systems of linear equations exactly and approximately (e.g., with graphs).

Standards Addressed
CCSS-M Standards in Unit 3:
A-REI.1, 3, 5, 6

Instructional Objectives
Students will be able to:

- Use properties to justify a solution method to a simple linear equation (informal proof).
- Solve linear equations in one variable, including literal equations with coefficients represented by letters.
- Solve linear inequalities in one variable and check that the solution set is reasonable.
- Solve equations and inequalities in one variable involving absolute value.
- Graph the solutions to an absolute value equation or inequality on a number line and interpret the solutions in terms of a situation it models.
- Solve simple exponential equations in one variable by inspection, for example $2^x = 8$, and verify solutions through substitution.

Suggested Activities

- Have students make connections between solving systems using the elimination method and solving systems using the substitution method. For example:

Solve:		Solve:	
Solve by substituon	Solve by elimination	Solve by substitution	Solve by elimination

UNIT 4: Descriptive Statistics

Students build on previous understanding of key ideas for describing distributions. They summarize, represent, compare, and interpret data sets beginning with situations involving a single measurement variable. Students also take a deeper

- ” Calculate the residuals of a linear graph (i.e. the distance between an observed data point and an estimated data value on a line of best fit), and plot them on a residual plot.
- ” Use a residual plot to determine whether a line of best fit is a good approximation for the data or not.
- · Create a scatter plot to represent given data, and determine if the data can be represented by a linear function.
- · For scatter plots that suggest a linear association, draw a line of best fit and write its equation.
- · Interpret the slope (rate of change) and the intercept (constant) for a line of best fit in the context of the data.
- · Compute the correlation coefficient of a linear fit (using technology) and use it to describe the strength of the relationship between the data.
- · Analyze data (from a table and/or scatter plot) and determine if it is likely that there is a causal relationship between the data.

Suggested Activities

- ” Provide opportunities for students to compare/contrast the different representations (dot plot, box plot, and histogram) and reason about which representation is appropriate for a given situation. Students can analyze the strengths and weaknesses of each type of representation by comparing different plots of the same data.
- ” Provide opportunities for students to gather their own set of data and organize it in a table first, then continue to use that set of data to show how to represent it on a box plot, dot plot, and histogram.
- ” Provide opportunities for students to explain why a given data set may (or may not) have outliers, and how that might affect the measure of center (mean or median) and how it might affect the spread (interquartile range or standard de ( )Tj 0.7s.

Summative Assessment Strategies

- Unit 4 Assessment from Walch Textbook; or
-

” Given a pre-image and an image, det

- Allow students to compare and contrast various methods for constructions, and decide which makes the most sense for them and for the problem. Ultimately, students should be making constructions with a compass and straightedge, but then should be able to compare their results with a construction done on patty paper or through geometry software.

Suggested A ssessment

Formative Assessment Strategies

- Use informal formative assessment strategies on a daily basis, for example, in the form of exit tickets, individual whiteboards, and/or student engagement in small group and whole group discussions
- Use appropriate problems from the textbook lessons (including the Problem-Based Task) in class and for homework
- Use links to the online tasks and other resources from our district curriculum map to assess students during the unit

Summative Assessment Strategies

- Unit 5 Assessment from Walch Textbook; or
- Online: CCSS IP Math 1 Unit 5 Assessment from www.walchconnect.com; or
- Customized online assessment on Unit 5 standards from https://scusd.illuminateed.com

UNIT 6: Connecting Algebra and Geometry through Coordinates

Suggested Activities

- Provide opportunities for students to make connections between a graphical approach and an algebraic approach to solving problems. For example:

Suggested Assessment

Formative Assessment Strategies

- Use informal formative assessment strategies on a daily basis, for example, in the form of exit tickets, individual whiteboards, and/or student engagement in small group and whole group discussions
- Use appropriate problems from the textbook lessons (including the Problem-Based Task) in class and for homework
- Use links to the online tasks and other resources from our district curriculum map to assess students during the unit

Summative Assessment Strategies

- Unit 6 Assessment from Walch Textbook; or
- Online: CCSS IP Math 1 Unit 6 Assessment from www.walchconnect.com; or

- Customized online assessment on Unit 6 standards from https://scusd.illuminateed.com

COURSE OF STUDY

FOR

Integrated Math 2

religion, sex, sexual orientation, parental, family or marital status, or association with a person or a group with one or more of these actual or perceived characteristics.

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and other polygons.

- Build new functions from existing functions

Linear, Quadratic, and Exponential Models

- Construct and compare linear, quadratic, and exponential models and solve problems
- Interpret expressions for functions in terms of the situations they model

Trigonometric Functions

- Prove and apply trigonometric identities

Geometry

Congruence

- Prove geometric theorems

Similarity, Right Triangles, and Trigonometry

- Understand similarity in terms of similarity transformations
- Prove theorems involving similarity

INSTRUCTIONAL MATERIALS
Textbook: CCSS IP Mathematics II by Walch Education (Publisher) 2014 www.walch.com

SUPPLEMENTARY MATERIALS:
SCUSD Math 2 Curriculum Map, found at www.scusd-math.wikispaces.com/Math2

SUGGESTED AVERAGE TIME FOR COVERING MAJOR UNITS

Units	Content Standards
Unit 1: Extending the Number System N25 days	N-RN.1–3 A-APR.1 N-CN.1,2
Unit 2: Quadratic Functions and Modeling N40 days	F-IF.4–9 F-BF.1ab,3,4a F-LE.3,6(CA)
Unit 3: Expressions and Equations N35 days	A-SSE.1–3 A-CED.1,2,4 A-REI.4a,4b,7 N-CN.7,8+,9+

Teacher Resources

- http://www.corestandards.org/
- www.walchconnect.com
- www.scusd-math.wikispaces.com/Math2
- www.learnzillion.com
- www.illustrativemathematics.org
- www.map.mathshell.org
- https://www.engageny.org/

Recommended Student Resources

- www.walchconnect.com
- See “Recommended Resources” in the Walch textbook (Teacher Resource books) for each lesson. This is a list of websites that can be used as additional resources. Some websites are games; others provide additional examples and/or explanations. The links for these resources are live in the PDF version of the Teacher Resource.

SECTION TWO — COURSE UNITS

See our SCUSD Curriculum Map for Math 2 to access links to documents, tasks, and resources related to the lessons within each unit. Our curriculum map is available here.

UNIT 1: Extending the Number System

Unit 1 focuses on 4 main topics: 1) expressions and equations with rational exponents; 2) properties of rational and irrational numbers; 3) adding, subtracting, and multiplying polynomials; and 4) adding, subtracting and multiplying complex numbers (in the form). Students will be introduced to complex numbers, in which they will discover the need for imaginary numbers and derive the definition of $^2 =$ F1.

Standards Addressed
CCSS-M Standards in Unit 1: N-RN.1,2,3; A-APR.1; N-CN.1,2

Instructional Objectives
Students will be able to:

- ” Understand and explain the connection between radicals with rational exponents
- ” Rewrite and evaluate expressions with rational exponents from mathematical and real-world contexts
- ” Make sense of why rational numbers form a closed system under addition and multiplication
- ” Use visual representations (for example "algebra tiles" or area models) to model multiplication of polynomials
- ” cl â ôÍ‡p -jnÑaG Amâ ñA - ò •mgz•$ % V

about a general rule that will always be true for rewriting rational exponents as radicals.

Suggested Assessments:

Formative Assessment Strategies

- Use informal formative assessment strategies on a daily basis, for example, in the form of exit tickets, individual whiteboards, and/or student engagement in small group and whole group discussions
- Use appropriate problems from the textbook lessons (including the Problem-Based Task) in class and for homework
- Use links to the online tasks and other resources from our district curriculum map to assess students during the unit

Summative Assessment Strategies

- Unit 1 Assessment from Walch Textbook; or
- Online: CCSS IP Math 2 Unit 1 Assessment from www.walchconnect.com; or
- Customized online assessment on Unit 1 standards from https://scusd.illuminateed.com

- v What probabilities should you calculate to determine for certain if the game is fair or not?

Suggested Assessment:

Formative Assessment Strategies

- ” Use informal formative assessment strategies on a daily basis, for example, in the form of exit tickets, individual whiteboards, and/or student engagement in small group and whole group discussions
- ” Use appropriate problems from the textbook lessons (including the Problem-Based Task) in class and for homework
- ” Use links to the online tasks and other resources from our district curriculum map to assess students during the unit

Summative Assessment Strategies

- ” Unit 4 Assessment from Walch Textbook; or

UNIT 5: Similarity, Right Triangle Trigonometry, and Proof

In Unit 5, students will use a variety of strategies for writing proofs related to triangle similarity, the Pythagorean Theorem, vertical angles and angles in parallel lines cut by a transversal, angles and centers of triangles, and properties of quadrilaterals. Students will also define and use the 6 trigonometric ratios, and prove the Pythagorean Identity $^2 + ^2 = 1$.

Standards Addressed
CCSS-M Standards in Unit 5:
G-GPE.6; G-SRT.1a,1b,2,3,4,5,6,7,8; G-CO.9,10,11; F-TF.8, 8.1(CA)

Instructional Objectives
Students will be able to:

- Investigate properties of dilations (including parallelism and scale factors)
- Define similarity and apply similarity using the Angle-Angle (AA) criterion
- Prove triangle similarity using Side-Angle-Side (SAS) and Side-Side-Side (SSS) similarity
- Prove the Pythagorean Theorem using similarity, and solve real-world problems using similarity and congruence
- Prove the vertical angles theorem, and theorems about angles in parallel lines cut by a transversal
- Prove the interior angle sum theorem, theorems about isosceles triangles, the mid-segment of a tringle, and centers of triangles
- Prove properties of parallelograms and special quadrilaterals
- Define and use trigonometric ratios; Prove the Pythagorean Identity and use it to simplify expressions

Suggested Activities

- Provide opportunities for students write proofs using a variety of strategies, including: using ample pictures to demonstrate results; using patty paper, transparencies, or dynamic geometry software to explore the relationships in a proof; creating flow charts and other organizational diagrams for outlining a proof; and writing step-by-step paragraph formats for the complete proof. Above all else, the reasoning involved in connecting one step in the logical argument to the next should be emphasized.
- Provide opportunities for students to experiment and explore with triangles, and to discover theorems about triangles using manipulatives like transparency paper, or geometry software, or through drawing pictures. For example, see discovery activities below:
  - Magical Triangle Theorem Activity
  - In-Class Activity – Explore Triangles

UNIT 6: Circles With and Without Coordinates

Unit 6 focuses on extensive work with circles, including understanding and using properties of central angles, inscribed angles, chords, and tangents. Students will do constructions with circles, as well as find circumference and area using radian measure. In addition to work with circles, Unit 6 also focuses on volumes of certain three-dimensional solids, and deriving the equations for a circle and a parabola.

Standards Addressed
CCSS-M Standards in Unit 6:
G-C.1,2,3,4(+),5; G-GMD.1,3,5(CA),6(CA); G-GPE.1,2,4

Instructional Objectives
Students will be able to:

- Find arc lengths and angles using properties of central angles, inscribed angles, chords, and tangents
- Construct inscribed circles, circumscribed circles, and tangent lines
- Find circumference and area of a circle, and area of a sector (using radian measure), in mathematical and real-world contexts
- Find volumes of cylinders, pyramids, cones, and spheres, in mathematical and real-world contexts
- Derive the equations of a circle and a parabola
- Use coordinates to prove geometric theorems about circles and parabolas

Suggested Activi ties

-

- Use informal formative assessment strategies on a daily basis, for example, in the form of exit tickets, individual whiteboards, and/or student engagement in small group and whole group discussions
- Use appropriate problems from the textbook lessons (including the Problem-Based Task) in class and for homework
- Use links to the online tasks and other resources from our district curriculum map to assess students during the unit

Summative Assessment Strategies

- Unit 6 Assessment from Walch Textbook; or
- Online CCSS IP Math 2 Unit 6 Assessment from www.walchconnect.com; or
- Customized online assessment on Unit 6 standards from https://scusd.illuminateed.com; or
- See assessments from the Math Assessment Project's "Formative Assessment Lessons" on circles and triangles

COURSE OF STUDY

FOR

Integrated Math 2 Plus

Course Codes:
INTEGRATED MATH 2 PLUS 1P / MIS203
INTEGRATED MATH 2 PLUS 2P / MIS204

Segment	High School
Length of Course	One Year
Developed by	Math Training Specialists (lead: Suzie Craig)
First Edition	Spring 2016

SACRAMENTO CITY UNIFIED SCHOOL DISTRICT

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Integrated Mathematics 2

SECTION ONE — GENERAL INFORMATION

COURSE D

embedded within them, which prepares students to go directly to AP Calculus AB upon completion of those 2 courses. Both options meet the University of California A – G requirements, and will prepare students for college and career opportunities upon graduation. This course is specifically designed for students who can move through the mathematics content at a faster pace, and who may be interested in further higher-level mathematics courses in college.

COURSE GOALS

Items that have a (+) are the additional Pre-Calculus "plus" standards that have been added to this course, to prepare students for Math 3 Plus the following year, and AP Calculus AB the year after that.

Upon completion of this course, students will be able to:

- Extend the laws of exponents to rational exponents
- Compare key characteristics of quadratic functions with those of linear and exponential functions.
- Create and solve equations and inequalities involving linear, exponential, and quadratic expressions (create equations from context, graph, solve, and interpret results in terms of the context; focus on quadratic functions).
- Extend work with probability (e.g. compute probabilities of compound events).
- Establish criteria for similarity of triangles based on dilations and proportional reasonin

COURSE STANDARDS

CCSS-M Standards for Mathematical Practice (K -12):

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
   3.1 (CA) Students build proofs by induction and proofs by contradiction
4. Model with Mathematics
5.

INSTRUCTIONAL MATERIALS

Textbook: CCSS IP Mathematics II by Walch Education (Publisher) 2014; and
CCSS IP Honors Supplement for SCUSD Mathematics II by Walch Education
www.walch.com

SUPPLEMENTARY MATERIALS:

SCUSD Math 2 Curriculum Map, found at www.scusd-math.wikispaces.com/Math2
SCUSD Math 2 Plus "Year at a Glance", found at www.scusd-math.wikispaces.com/Math2

SUGGESTED AVERAGE TIME FOR COVERING MAJOR UNITS

Units	Content Standards
Unit 1: Extending the Number System ≈25 days	N-RN.1–3 A-APR.1 N-CN.1,2 (+)N-CN.3,4,5,6
Unit 2: Quadratic Functions and Modeling ≈40 days	F-IF.4–9 F-BF.1ab,3,4a F-LE.3,6(CA)
Unit 3: Expressions and Equations ≈35 days	A-SSE.1–3 A-CED.1,2,4 A-REI.4a,4b,7 N-CN.7,8+,9+
Unit 4: Applications of Probability ≈25 days	S-CP.1–7, 8+,9+ S-MD.6+,7+
Unit 5: Similarity, Right Triangle Trigonometry, and Proof ≈25 days	G-GPE.6 G-SRT.1–8, 8.1(CA) G-GMD.6(CA) G-CO.9–11 F-TF.8 (+)N-VM.1,2,3,4,5
Unit 6: Circles With and Without Coordinates ≈20 days	G-C.1–3,4+,5 G-GMD.1,3 G-GMD.5(CA)

SECTION TWO — COURSE UNITS

See our SCUSD Curriculum Map for Math 2 to access links to documents, tasks, and resources related to the lessons within each unit. Our curriculum map is available here.

UNIT 1: Extending the Number System

Unit 1 focuses on 4 main topics: 1) expressions and equations with rational exponents; 2) properties of rational and irrational numbers; 3) adding, subtracting, and multiplying polynomials; and 4) adding, subtracting and multiplying complex numbers (in the form). Students will be introduced to complex numbers, in which they will discover the need for imaginary numbers and derive the definition of $^2 = F1$.

The honors lessons in this unit extend students' work with complex numbers to include finding a conjugate, and representing complex numbers and their operations on the complex plane.

Standards Addressed
CCSS-M Standards in Unit 1: N-RN.1,2,3; A-APR.1; N-CN.1,2
Pre-Calculus plus (+) standards included in Unit 1: (+)N-CN.3,4,5,6

Instructional Objectives
Students will be able to:

- Understand and explain the connection between radicals with rational exponents
- Rewrite and evaluate expressions with rational exponents from mathematical and real-world contexts
- Make sense of why rational numbers form a closed system under addition and multiplication
- Use visual representations (for example "algebra tiles" or area models) to model multiplication of polynomials
- Perform operations with polynomials, including from a real-world context
- Discover the need for imaginary numbers, and derive $^2 = F1$
- Perform operations with complex numbers, including from a real-world context
- (+) Explain why the rectangular and polar forms of a given complex number represent the same number
- (+) Represent operations and conjugation of complex numbers geometrically on the complex plane

Suggested Activities:

- Provide opportunities for students to explain the connection between radicals and rational exponents. For example:
  - See task: Evaluating Exponential Expressions
  - Students could complete this task with a partner or small group in class, during which they will make sense of the two methods shown to them, evaluate expressions with rational exponents, and reason about a general rule that will always be true for rewriting rational exponents as radicals.

UNIT 2: Quadratic Functions and Modeling

Unit 2 focuses on graphing various functions and identifying key features from the graph, including intercepts, maxim and minima, as well as comparing the properties of exponential, linear, and quadratic functions. Students are introduced to quadratic functions and will focus solely on understanding the graph and key features of a quadratic function [Note: Students will not solve quadratic equations in this unit]. Students will also be introduced to the graphs and key features of absolute value, step, and piecewise-defined functions.

Standards Addressed

CCSS-M Standards in Unit 2: F-IF.4,5,6,7a,7b,8a,8b; F-BF.1a,1b,3,4a; F-LE.3, 6(CA)

Instructional Objectives

Students will be able to:

- Graph quadratic functions from mathematical and real-world contexts
- Interpret key features of quadratic functions, including domain and average rate of change, and interpret those key features in terms of the situation it models in a real-world context
- Build quadratic functions from a real-world context
- Graph other functions: square root, cube root, absolute value, step functions, and piecewise functions
- Compare properties of exponential, linear, and quadratic functions
- Use their understanding if the key features of the graph in order to transform and translate quadratic functions
- Discover the relationship between an original function and its' inverse; find inverse functions

Suggested Activities

wells will have on oil production. Use this model to determine the maximum number of wells Cal should have on his land.

Suggested Assessment

Formative Assessment Strategies

- Use informal formative assessment strategies on a daily basis, for example, in the form of exit tickets, individual whiteboards, and/or student engagement in small group and whole group discussions
- Use appropriate problems from the textbook lessons (including the Problem-Based Task) in class and for homework
- Use links to the online tasks and other resources from our district curriculum map to assess students during the unit

Summative Assessment Strategies

- Unit 2 Assessment from Walch Textbook; or
- Online: CCSS IP Math 2 Unit 2 Assessment from www.walchconnect.com; or
- Customized online assessment on Unit 2 standards from

UNIT 3: Expressions and Equations

Unit 3 focuses on creating and solving quadratic equations and inequalities in

UNIT 4: Applications of Probability

Unit 4 builds on students' previous experiences and understanding of

- What probabilities should you calculate to determine for

UNIT 5: Similarity, Right Triangle Trigonometry, and Proof

In Unit 5, students will use a variety of strategies for writing proofs related to triangle similarity, the Pythagorean Theorem, vertical angles and angles in parallel lines cut by a transversal, angles and centers of triangles, and properties of quadrilaterals. Students will also define and use the 6 trigonometric ratios, and prove the Pythagorean Identity $^{2} + ^{2} = 1$.

The honors lessons in this unit will introduce students to vectors, and will focus on representing and modeling with vector quantities and performing operations on vectors.

Standards Addressed
CCSS-M Standards in Unit 5:
G-GPE.6; G-SRT.1a,1b,2,3,4,5,6,7,8; G-CO.9,10,11; F-TF.8, 8.1(CA)
Pre-Calculus plus (+) standards included in Unit 5: (+)N-VM.1,2,3,4,5

Instructional Objectives
Students will be able to:

- Investigate properties of dilations (including parallelism and scale factors)
- Define similarity and apply similarity using the Angle-

- Provide opportunities for students to experiment and explore with triangles, and to discover theorems about triangles using manipulatives like transparency paper, or geometry software, or through drawing pictures. For example, see discovery activities below:
  - Magical Triangle Theorem Activity
  - In-Class Activity –

UNIT 6: Circles With and Without Coordinates

Unit 6 focuses on extensive work with circles, including understanding and

- Use the Vitruvian Man Math Project as a way to engage students in understanding the angles of a quadrilateral inscribed in a circle, and a connection to art.

Suggested Assessment:

Formative Assessment Strategies

- Use informal formative assessment strategies on a daily basis, for example, in the form of exit tickets, individual whiteboards, and/or student engagement in small group and whole group discussions
- Use appropriate problems from the textbook lessons (including the Problem-Based Task) in class and for homework
- Use links to the online tasks and other resources from our district curriculum map to assess students during the unit

Summative Assessment Strategies

- Unit 6 Assessment from Walch Textbook, including progress assessment from “Honors Supplement” book; or
- Online CCSS IP Math 2 Unit 6 Assessment from www.walchconnect.com; or
- Customized online assessment on Unit 6 standards from https://scusd.illuminateed.com; or
- See assessments from the Math Assessment Project’s “Formative Assessment Lessons” on circles and triangles
    - Solving Problems with Circles and Triangles
    - Inscribing and Circumscribing Right Triangles