



SACRAMENTO CITY UNIFIED SCHOOL DISTRICT BOARD OF EDUCATION

Agenda Item 9.1f

Meeting Date: August 18, 2016

Subject: Approve Course of Study for Integrated Math 3 Plus ET EMC /P <</MCID 12 >>BD sequence of courses that build upon the foundation established in elementary 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.

The “plus” (+) standards are additional standards written in the CGMS that prepare students for advanced math courses, like AP Calculus and college math courses. High schools will generally offer two options for mathematics courses. In Option 1, students take Math 1, Math 2, and Math 3, followed by Pre-Calculus (or other 4th course options, e.g. Statistics or College Ready Math). In Option 2, students take Math 1, Math 2 Plus, and Math 3 Plus, followed by AP Calculus AB. Math 2 Plus and Math 3 Plus have the Pre-Calculus standards 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. The plus courses are specifically designed for students who can move through the mathematics content at a faster pace, and who may be interested in further high-level mathematics courses in college.

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

Financial Considerations: None



COURSE OF STUDY

FOR

Integrated Math 3 Plus

Course Codes:

INTEGRATED MATH 3 Plus 1P / MIS303

INTEGRATED MATH 3 Plus 2P / MIS304

| | |
|------------------|--|
| 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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Algebra

Seeing Structure in Expressions

Interpret the structure of expressions (A-SSE.1–2)

Write expressions in equivalent forms to solve problems (A-SSE.4)

Arithmetic with Polynomials and Rational Expressions

Perform arithmetic operations on polynomials (A-APR.1)

Understand the relationship between zeros and factors of polynomials (A-APR.2,3)

Use polynomial identities to solve problems (A-APR.4,5+)

Rewrite rational expressions (A-APR.6,7+)

Creating Equations

Create equations that describe numbers or relationships (A-CED.1,2,3,4)

Reasoning with Equations and Inequalities

Understand solving equations as a process of reasoning and explain the reasoning (A-REI.2)

Solve systems of equations (+A-REI.8,9)

Represent and solve equations and inequalities graphically (A-REI.11)

Functions

Interpreting Functions

Interpret functions that arise in applications in terms of the context (F-IF.4,5,6)

Analyze functions using different representations (F-IF.7b,7c,7d+,7e,8,9,10(CA) 11(CA))

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Building Functions

Build a function that models a relationship between two quantities (F-BF.1b,1c+)

Build new functions from existing functions (F-BF.3,4a,4b+,4c+,5+)

Linear, Quadratic, and Exponential Models

Construct and compare linear, quadratic, and exponential models and solve problems (F-LE.4,4.1(CA),4.2(CA),4.3(CA))

Trigonometric Functions

Extend the domain of trigonometric functions using the unit circle (F-

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Geometric Measurement and Dimension

Visualize relationships between two-dimensional and three-dimensional objects (G-GMD.4)

Modeling with Geometry

Apply geometric concepts in modeling situations (G-MG.1,2,3)

Statistics and Probability

Interpreting Categorical and Quantitative Data

Summarize, represent, and interpret data on a single count or measurement variable (S-ID.4)

Making Inferences and Justifying Conclusions

Understand and evaluate random processes underlying statistical experiments (S-IC.1,2)

Make inferences and justify conclusions from sample surveys, experiments, and observational studies (S-IC.3,4,5,6)

Using Probability to Make Decisions

Use probability to evaluate outcomes of decisions (S-MD.6+,7+)

To read the descriptions of the Standards for Mathematical Practice and to read the specific Math 3 Content Standards, see the [CA Framework for Math 3](#).

INSTRUCTIONAL MATERIALS

SUGGESTED AVERAGE TIME FOR COVERING MAJOR UNITS

| Units | Content Standards |
|--|--|
| <p>Unit 1: Inferences and Conclusions from Data</p> <p>40 days</p> | <p>S-ID.4 S-IC.1-6 S-MD.6-7</p> |
| <p>Unit 2A Polynomials Relationships</p> <p>40 days</p> | <p>A-SSE.1-4 A-REI.11 A-APR.1-5 N-CN.8-9 F-IF.7c <i>(+)N-VM.6 – 12</i> <i>(+)A-REI.8,9</i></p> |
| <p>Unit 2B: Rational and Radical Relationships</p> <p>20 days</p> | <p>A-SSE.1–2 A-REI.1,2,11 A-APR.6,7 <i>(+)F-IF.7d</i></p> |
| <p>Unit 3: Trigonometry of General Triangles and Trigonometric Functions</p> <p>25 days</p> | <p>F-TF.1,2, 2.1(CA),5 G-SRT.9-11 <i>(+)F-IF.10,11 (CA)</i> <i>(+)F-TF.3,4,6,7,9,10</i> <i>(+)F-BF.4d</i></p> |

Unit 4A: Mathematical Modeling of Inverse, Logarithmic and Trigonometric Functions

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TEACHER RESOURCES

<http://www.corestandards.org/>
www.walchconnect.com
www.scusd-math.wikispaces.com/Math3
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.*

In the following assignment, "[Unfair Profiling](#)", students will implement a simulation based on given data to justify a claim about unfair police demographic profiling. In this assignment, students will design a simulation in which they will identify the treatment, model the trial using a graphing calculator or random number generator, calculate the sample mean and interpret its results, and justify a claim based on the simulation results.

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 3 Unit 1 Assessment from www.walchconnect.com;

or

Customized online assessment on Unit 1 standards from <https://scusd.illuminateed.com>

UNIT 2A: Polynomial Relationships

Unit 2A focuses on polynomial functions (operations, proving identities, solving, and graphing.) Students will deepen their understanding of the set of polynomials, and will understand how polynomial identities help with factoring and expanding polynomials, leading to the binomial theorem. They will identify and analyze key features of polynomial graphs and learn how the degree and sign of the leading coefficient can be used to determine end behavior of a graph.

The honors lessons in this unit focus on vector and matrix quantities. Students will understand the definition of a vector, perform operations with vectors (add, subtract, and multiply by a scalar), and solve problems involving velocity and other quantities that can be represented by vectors. Students will use matrices to represent data, perform operations on matrices (add, subtract, and multiply), and use matrices to represent and solve a system of linear equations.

Standards Addressed

CCSS-M Standards in Unit 2A:

A-SSE.1-4; A-REI.11; A-APR.1-5; N-CN.8-9; F-IF.7c, (+)N-VM.6 – 12; (+)A-REI.8,9

Instructional Objectives

Students will be able to:

Add, subtract, and multiply polynomials

Prove polynomial identities (including complex polynomial identities), and use the binomial theorem to expand a polynomial

Graph polynomial functions from mathematical and real-world contexts; integrated

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 2A Assessment from Walch Textbook; **or**

Online: CCSS IP Math 3 Unit 2A Assessment

from www.walchconnect.com;

or Customized online assessment on Unit 2A standards

from <https://scusd.illuminateed.com>

UNIT 3: Trigonometry of General Triangles and Trigonometric Functions

In Unit 3, students will explore graphs of trigonometric functions in connection to the unit circle. They will understand radian measure and explain the connection between the unit circle and graphing trig functions on a coordinate plane. Students will prove non-right triangle trig laws (Law of Sines and Law of Cosines) and apply them to real-world scenarios. Students will use periodic trig functions (sine, cosine, and tangent) to model data and analyze amplitude, frequency, and midline. *The honors lessons in this unit focus on graphing polar coordinates and curves, using the unit circle, using trig inverse functions, and proving trigonometric identities. Students will convert between polar and rectangular coordinate systems and understand and graph functions defined parametrically. Students will use special triangles and the unit circle to determine trigonometric values of certain angles, prove addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems, and prove the half angle and double angle identities.*

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UNIT 4B: Mathematical Modeling and Choosing a Model

Unit 4B focuses on using function families to generate models that fit real-world situations. Students will create equations and understand the constraints surrounding models arising from linear, quadratic, and simple rational and exponential situations. They will explore transformations of parent graphs, and make generalizations about them across many different types of functions. Students will compare properties within functions, including recognizing whether a function is even or odd. Function types included in this section are: linear, exponential, quadratic, trigonometric, logarithmic, square root, cube root, absolute value, step, and piecewise. Finally, students will apply geometric methods to identify cross sections, describe objects, and solve design problems.

Standards Addressed

CCSS-M Standards in Unit 4B: A-CED 1;ns15 TD04 Tw:1b,6(g)3;(nd pi Tc 0.004 Tw 04.68B)1(:)2(

Use links to the online tasks and other resources from our district curriculum map to assess students during the unit

Summative Assessment Strategies

Unit 4B Assessment from Walch Textbook; **or**
Online CCSS IP Math 3 Unit 4B Assessment from www.walchconnect.com;
or
Customized online assessment on Unit 4B standards
from <https://scusd.illuminateed.com>