Palm Springs Unified School District
Secondary Course Description

Please read: ***Sections 1 and 2 must be completed and submitted to the Director of Secondary Curriculum and Instruction for all courses seeking PSUSD Cabinet and Board approval. Sections 3 and/or 5 must be completed if the course will be submitted to the University of California (UC) for placement on your school's a-g list and/or Career and technical educational (CTE).***

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Transcript Title(s)/Abbreviation: Integrated Math III Hon

Transcript Course Code(s)/Number(s): 2227

Cabinet/ BOE Approval Date: April 25, 2017

Section 1: Course Content

1. Course Title: Integrated Math III Honors

Date this course was first submitted to the Curriculum Advisory**:**

2. Is this a re-write of an existing course? No If "Yes," what is the District Course Code:

3. CALPADS Code : 2442

4. PSUSD graduation requirement subject area: Math

5. Unit Value for complete course: 10 PSUSD credits (one year/two semesters)

Course can be repeated for Credit? ☐

6. Grade Level: 10 11 12 --

Note: Grade level pertains to which grades the course has been designed.

7. PSUSD Department: Mathematics

8. PSUSD weighted GPA? Yes

9. Is this an "online" learning course? No

If "Yes," list the online provider:

Note: If "Yes," an additional course code will be created by ETIS with a virtual designation.

10. Will this course be offered only through the Alternative Education Program? No

11. Career Pathway Relationship

Note: Refer to the list of Industries and their associated Pathways in Section 5, Item #38

Is this course an Industry and Career Pathway-related Course? No

If "Yes," which Industry? --

Which Pathway?

What sequence level? --

12. Is this course an Academy-related Course? No

If "Yes," which Academy?

13. Course Content:
For each unit of the course, provide:

1. A brief description (5-10 sentences) of topics to be addressed that demonstrates the critical thinking, depth and progression of content covered.
2. A brief summary (2-4 sentences) of at least one assignment that explains what a student produces, how the student completes the assignment and what the student learns.

Unit 1: Interpreting Data in Normal Distributions

Unit 1 Overview:

The first lesson of this chapter leverages student knowledge of relative frequency histograms to introduce normal distributions. Students explore the characteristics of normal distributions. In the second lesson, students build their knowledge of normal distributions using the Empirical Rule for Normal Distributions. Students use the Empirical Rule for Normal Distributions to determine the percent of data between given intervals that are bounded by integer multiples of the standard deviation from the mean. In the third lesson, students use a z-score table and a graphing calculator to determine the percent of data in given intervals that are bounded by non-integer multiples of the standard deviation from the mean. In the last lesson, students use their knowledge of probability and normal distributions to analyze scenarios and make decisions.

Unit 1 Students Will Learn To:

•Label data as either continuous or discrete
•Sketch a relative frequency histogram for a distribution and determine if it is a normal or non-normal distribution
•Identify the mean and standard deviation for normal distributions
•Draw a curve on the same axes as a given curve with new properties
•Shade the corresponding region under a standard normal curve
•Estimate the percent of data within specific intervals of a normal distribution, shade the corresponding region, and label the distribution
•Calculate a percent using a z-score table given a normal distribution
•Determine a percent using a graphing calculator given a normal distribution
•Calculate a percentile using a z-score table given a normal distribution
•Determine a percentile using a graphing calculator given a normal distribution
•Calculate probabilities given a normal distribution
•Calculate probabilities given a mean and a standard deviation
•Answer questions given a mean and a standard deviation

Unit 1 Assignments:

•Homework
•Quizzes
•Classwork Task: Off the Mark: Z-Scores and Percentiles
•End of Unit Test

Unit 1 Task:Off the Mark: Z-Scores and Percentiles

In this task, The fuel efficiency of hybrid cars, in miles per gallon, cars, in miles per gallon, is modeled by a standard normal distribution. Students use the Empirical Rule for Normal Distributions to estimate the percent of data within specific intervals. The concept of z-scores is introduced in order to determine the percent of data in an interval that is not aligned with integer multiples of the standard deviation from the mean. Students use a z-score table to determine the percent of data less than a given data value. A worked example uses the graphing calculator to determine the percent of data below a given z-score. Different student work provides additional opportunity to further analyze using a z-score table and a graphing calculator to determine the percent of data in a specified interval.

Unit 2: Making Inferences & Justifying Conclusions

Unit 2 Overview:

The first two lessons focus on methods of collecting data to analyze a question or characteristic of interest, specific sampling methods, and the significance of randomization. Then, students use data from samples to estimate population means and proportions, and determine whether results are statistically significant. In the last lesson, students have the opportunity to complete a culminating project based on concepts from the chapter.

Unit 2 Students Will Learn To:

•Identify populations, samples, and characteristics of interest for situations
•Classify scenarios as sample surveys, observational studies, or experiments, and identify treatments of experiments
•Explain how confounding could occur in observational studies
•Select subjective samples that best represent the means of data sets
•Use a random number generator to select random samples
•Determine whether studies have biases
•Select stratified random samples and cluster samples from given data sets
•Estimate population means using data from samples
•Determine whether scenarios represent 68%, 95%, or 99.7% confidence intervals
•Determine 95% confidence intervals to estimate population proportions and population means
•Label horizontal axes of sampling distributions and determine data values that are statistically significant
•Use 95% confidence interval to determine whether differences between population proportion estimates are statistically significant
• Determine 95% confidence intervals to estimate population means
•Use given confidence intervals to make inferences about populations
•Decide whether sample surveys, observational studies, or experiments are the best methods for given scenarios and describe how to obtain random samples
•Decide whether random sampling, stratified random sampling, or clustered sampling is the best method for given scenarios and describe how to obtain samples
•Identify possible biases in scenarios
•Create dot plots and histograms for data sets
•Create box-and-whisker and stem-and-leaf plots for data sets
•Determine means, medians, and modes of data sets and describe whether data sets are symmetric
•Determine standard deviations and quartiles of data sets

Unit 2 Assignments:

•Homework
•Quizzes
•Classwork Task:Sleep Tight: Using Confidence Intervals to Estimate Unknown Population Means
•End of Unit Test

Unit 2 Task: Every Vote Counts: Using Confidence Intervals to Estimate Unknown Population Means

In this task, a poll measuring the support for the re-election of a mayor is conducted and a measure of error for the poll is given. Students answer questions related to the situation, and conduct a simulation using a random number generator. They combine their results with classmates to enlarge the sample size and compare the results of the simulation to the results of the original poll. The terms population proportion, sample proportion and sampling distribution are defined and the formula for calculating the standard deviation of the sampling distribution is given. Students apply the formula to the problem situation and conclude that as the sample size increases, the standard deviation of a sampling distribution decreases. Confidence interval is defined and students calculate confidence intervals.

Unit 3 - Searching for Patterns

Unit 3 Overview:

This chapter begins with opportunities for students to analyze and describe various patterns. Questions ask students to represent algebraic expressions in different forms and use algebra and graphs to determine whether they are equivalent. Lessons provide opportunities for students to identify linear, exponential, and quadratic functions using multiple representations. Lessons introduce students to the concept of building new functions on a coordinate plane by operating on separate functions.

Unit 3 Students Will Learn To:

•Draw the next three terms of a pattern
•Answer questions about given patterns
•Determine the next number in a given sequence
•Write an expression to represent a given pattern
•Determine whether two expressions are equivalent
•Represent a pattern as an expression, a graph, and then identify the function family
•Determine whether two functions are equivalent
•Model a given problem situation using a table, a graph, and a function
•Write expressions and answer questions for given problem situations
•Determine whether two expressions are equivalent
•Complete tables from given situations, and then graph the function
•Define a function to represent a given problem situation, graph the function, and then answer a question
•Add two functions graphically
•Sketch a new function from a given relationship, and then use a table of values to verify the result
•Use algebra to verify the sum of two functions is equivalent to a third function

Unit 3 Assignments:

•Homework
•Quizzes
•Classwork Task: It's Moving...It's Alive!: Analyzing Graphs to Build new functions
•End of Unit Test

Unit 3 Task: Floors by Terrance: Using Patterns to Generate Algebraic Expressions In this task, students will use a tile pattern from a previous lesson to write an expression for the number of new tiles that need to be added to an n by n square where n represents a positive odd value. Students will analyze four equivalent expressions to determine the new number of tiles added one pattern, to create another tile pattern, using the n by n square model. Students will then analyze 4 different student solutions and show that all of the algebraic expressions are equivalent by combining like terms and using the distributive property.

Unit 4 - Quadratic Functions

Unit 4 Overview:

This chapter begins with a matching and sorting activity to review the different forms of quadratic functions. Key characteristics of quadratic functions and graphs are identified. Lessons then provide opportunities for students to explore and identify transformations performed on a quadratic function f(x) to form a new function. This transformational function form is introduced in order to abstract the general principle that transformations on a graph always have the same effect regardless of the type of underlying function. In the later part of the chapter, lessons provide opportunities for students to explore and understand what conditions are necessary to write a unique quadratic function. The set of complex numbers is introduced and students will operate with the imaginary number i. Finally, students will solve quadratic functions over the set of complex numbers.

Unit 4 Students Will Learn To:

•Choose the quadratic functions that match the graphs
•Determine the most efficient form to write quadratic functions
• Convert quadratic functions from factored form to standard form
• Convert quadratic functions from vertex form to standard form
• Write quadratic functions to represent situations
•Write transformed quadratic functions in terms of other functions
• Graph and describe vertical dilations of quadratic functions
•Write equations of quadratic functions given their graphs
•Sketch graphs of transformed quadratic functions given their equations in terms of the basic function
•Write transformed quadratic functions in terms of other functions
•Use reference points to write equations for quadratic functions
•Use a graphing calculator to write quadratic equations given three points on a parabola
•Create and use systems of equations to write quadratic equations given three points on a parabola
•Calculate powers of i
•Determine products of complex numbers
•Identify expressions as monomial, binomial, or trinomial
•Simplify expressions involving i
•Write conjugates of complex numbers
•Determine quotients of complex numbers
•Use the Quadratic Formula to solve quadratic equations
•Use discriminants to determine the types of zeros of quadratic functions
•Factor quadratic functions and determine the types of zeros

Unit 4 Assignments:

•Homework
•Quizzes
•Classwork Task: Function Sense: Translating Functions:Up, Down, Left, Right
•End of Unit Test

Unit 4 Task: Up, Down, Left, Right: Right Translating Functions: In this task, transformations are applied to a basic quadratic function to create new functions. Students are given a quadratic function written in vertex form and they describe how the h- and k-values affect the graph of the basic quadratic function. The transformational function form is introduced and students will describe how certain values in the function affect the graph of the basic function. The argument of a function is defined as the variable, term, or expression on which the function operates. Students analyze a worked example that uses reference points to graph a function. They will treat the vertex of the transformed function as the “origin” of a new set of axes and then locate the symmetric points. Students then complete a table of values and graph several functions written in vertex form.

Unit 5 - Polynomial Functions

Unit 5 Overview:

This chapter begins with two different problem situations to explore how cubic functions are built. Lessons provide opportunities for students to connect characteristics and behaviors of cubic functions to their factors. An emphasis is placed on verifying equivalence between different forms both algebraically and graphically. Students will explore polynomial functions to gain an understanding of end behavior, symmetry, and whether a function is even, odd, or neither. Questions will ask students to graph, write, and explain the effects of transformations on cubic functions, and then draw conclusions about how symmetry is preserved in transformed functions. In the later part of the chapter, lessons focus on building various polynomial functions by operating with the basic power functions on a coordinate plane and in a table of values. Questions then ask students to compare and contrast the various polynomials to understand all the possible shapes and key characteristics for linear, quadratic, cubic, quartic, and quintic functions. At the end of the chapter, lessons focus on students' understanding that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication

Unit 5 Students Will Learn To:

•Determine possible volumes for a box given other dimensions and determine relative maximums or minimums
•Determine products of three linear factors or products of linear and quadratic factors and verify graphically
•Sketch the graphs of power functions and describe end behavior
•Determine whether functions are even, odd, or neither both graphically and algebraically
•Use reference points to graph cubic and quartic functions
•Given graphs of two functions, write the equation of one function in terms of the other function
•Describe transformations performed on one function given its equation in terms of another function
•Graph and write a specific equation for a function given its equation in terms of power functions
•List numbers of possible extrema for polynomials of given degrees
•Sketch graphs of polynomials given their characteristics
•Choose equations of polynomials that can model given graphs of polynomials
•Sketch a set of functions whose product builds a cubic or quartic with given characteristics
•Write different equations for cubics with given characteristics
•Sketch graphs of cubics that are products of given functions
•Determine whether given graphs represent polynomial functions
•Determine whether sets of numbers are closed under indicated operations
•Perform indicated operations on sets of polynomials to show whether they are closed under those operations

Unit 5 Assignments:

•Homework
•Quizzes
•Classwork Task: Function Makeover: Transformations and Symmetry of Polynomial Functions
•End of Unit Test

Unit 5 Task: Multiple Transformations: Transformations and Symmetry of Polynomial Functions

In this task, students will analyze two graphs and describe the transformations performed on one graph to create the other. They will then write an equation for the second graph in terms of the first.

Unit 6 - Polynomial Expressions & Equations

Unit 6 Overview:

This chapter presents opportunities for students to analyze, factor, solve, and expand polynomial functions. The chapter begins with an analysis of key characteristics of polynomial functions and graphs. Lessons then provide opportunities for students to divide polynomials using two methods and to expand on this knowledge in order to determine whether a divisor is a factor of the dividend. In the later part of the chapter, lessons provide opportunities for students to utilize polynomial identities to rewrite numeric expressions and identify patterns.

Unit 6 Students Will Learn To:

•Determine the average rate of change for given intervals of polynomial functions
•Solve equations using information from graphs
•Write zeros which correspond to factors and vice-versa
•Determine whether given factors are factors of polynomials
•Determine quotients using polynomial long division or synthetic division and rewrite dividends as products
•Determine function values using the Remainder Theorem
•Determine whether given expressions are factors of polynomials using the Factor Theorem
•Determine whether given functions are the factored form of other functions using the Factor Theorem
•Determine unknown coefficients given factors of functions using the Factor Theorem
•Factor expressions completely using the GCF, chunking, or grouping
•Factor quartic expressions completely using quadratic form
•Factor binomials using sum or difference of perfect cubes
•Factor binomials completely over the set of real numbers using difference of squares
•Factor perfect square trinomials
•Use polynomial identities and number properties to perform calculations
•Determine whether sets of numbers are Pythagorean triples
•Generate Pythagorean triples using given numbers and Euclid's Formula

Unit 6 Assignments:

•Homework
•Quizzes
•Classwork Task: The Factors of Life, The Factor Theorem and Remainder Theorem: Factors to Consider
•End of Unit Test

Unit 6 Task: Factors to Consider: The Factor Theorem and Remainder Theorem

In this task, the Factor Theorem is stated. Students will analyze an example that shows how the Factor Theorem is used to solve a problem. A worked example continues to factor the quadratic expression with the linear factor and students use the Factor Theorem to prove each factor shown in the worked example is correct. A graphing calculator, polynomial long division, or synthetic division can also be used to verify the factors are correct. Students then use the Factor Theorem to prove the product of two imaginary roots written as factors is in fact the factored form of a given quadratic function. In the last activity, two polynomial functions are written with a missing coefficient in one term. They are given one linear factor of the function and asked to determine the unknown coefficient.

Unit 7 - Polynomial Models

Unit 7 Overview:

This chapter provides opportunities for students to solve polynomial inequalities algebraically and graphically. Lessons present various problem situations and ask students to use a graphing calculator to determine the polynomial regression function that best models the data. Students then use their regression functions to answer questions. Piecewise functions are introduced for situations where a single polynomial function is not the most appropriate model for a set of data. At the end of the chapter, the lesson provides opportunities for students to compare properties of two functions each represented in a different way. Questions present functions that are represented using a graph, table of values, equation, or description of its key characteristics.

Unit 7 Students Will Learn To:

•Analyze graphs and identify sets of x-values to represent polynomial inequalities
•Use a graphing calculator to solve polynomial inequalities
•Solve polynomial inequalities by factoring and sketching
•Create scatter plots and predict the type of polynomial that best fits the data
•Use a graphing calculator to determine regression equations and how well they model the data
•Use data and regression equations to make predictions for problem situations
•Sketch piecewise functions on the coordinate plane
•Write equations of piecewise functions given graphs
•Analyze scatter plots and determine regression equations for given intervals to write piecewise functions
•Create scatter plots for data sets
•Analyze data sets and scatter plots to describe polynomial functions that model the data
•Use a graphing calculator to determine regression equations that model data
• **Compare polynomials in different representations.**

Unit 7 Assignments:

•Homework
•Quizzes
•Classwork Task: Modeling Gig: Modeling Polynomial Data
•End of Unit Test

Unit 7 Task: "Polynomial Models" for $500, Please!: Modeling Polynomial Data

In this task, a table of values describes the cost of ticket to a school fundraiser, which is dependent on the number of participants. Students will write the principal a letter summarizing the potential profits of the fundraiser depending on the number of participants. To do this, they first determine a quadratic regression equation and identify the vertex of the parabola as the point which tells them the maximum money that can be raised and the cost of the ticket that will generate this money.

Unit 8 - Sequences & Series

Unit 8 Overview:

This chapter begins with a review of arithmetic and geometric sequences and their explicit and recursive formulas. Lessons provide opportunities for students to explore finite and infinite arithmetic series, and then finite and infinite geometric series are used to derive formulas to compute each type of series.

Unit 8 Students Will Learn To:

•Identify whether sequences are arithmetic, geometric, or neither and determine common differences or common ratios
• Create sequences and include the first four terms
•Identify arithmetic or geometric sequences, write recursive formulas, and determine the next term
•Identify arithmetic or geometric sequences, write explicit formulas, and determine the n^{th} term
•**Explore infinite Arithmetic and Geometric series.**
•**Apply Geometric series to real world situations.**

Unit 8 Assignments:

•Homework
•Quizzes
•Classwork Task: I Am Having a Series Craving (For Some Math)! : Geometric Series
•End of Unit Test

Unit 8 Task: Formula: Not Just for Babies: Arithmetic and Geometric Sequences

In this task, students will review explicit and recursive formulas for arithmetic and geometric sequences. They will use both types of formulas to determine specific terms in sequences developed in a previous problem. They will then be given several terms in sequences and identify whether the sequence is arithmetic or geometric and determine the 50th term. Students will be given two situations and will use either the recursive or explicit formula to solve problems.

Unit 9 - Rational Functions

Unit 9 Overview:

This chapter presents opportunities for students to analyze, graph, and transform rational functions. The chapter begins with an analysis of key characteristics of rational functions and graphs. Lessons then expand on this knowledge for transformations of rational functions. Students will determine whether graphs of rational functions have vertical asymptotes, removable discontinuities, both, or neither, and then sketch graphs of rational functions detailing all holes and asymptotes. Finally, students will explore problem situations modeled by rational functions and answer questions related to each scenario.

Unit 9 Students Will Learn To:

•Determine whether a function is a rational function or not a rational function
•Describe the vertical and horizontal asymptotes from a graph of rational functions
•Determine the measure of minor arcs, central angles, inscribed angles, intercepted arcs
•Determine the domain and range for rational functions in the form $f(x) = \frac{a}{x^n}$, where a is a non-zero real number and n is an integer greater than or equal to 1
•Describe the end behavior of rational functions in the form $f(x) = \frac{a}{x}$, where a is a non-zero real number and x is an integer greater than or equal to 1
•Describe the end behavior of rational functions as x approaches zero from the left and as x approaches zero from the right.
•Analyze given key characteristics of rational functions of the form $f(x) = \frac{1}{x^n}$ and identify whether the characteristic is modeled by an odd power of n, an even power of n, or both
•Determine the domain, range, and vertical and horizontal asymptotes of rational functions without using a graphing calculator
•Write a rational function for the table, graph, or description provided
•Sketch rational functions without using a graphing calculator
•Use algebra to determine the vertical asymptotes of rational functions
•Sketch rational functions without using a graphing calculator, and then indicate the domain, range, vertical and horizontal asymptote(s), and y-intercept
•Sketch a graph of the transformations performed on the function $f(x) = \frac{1}{x}$
•Write a rational function to match a given characteristic
•Simplify rational expressions and list any restrictions on the domain
•Determine whether graph of rational functions have a vertical asymptote, a removable discontinuity, both, or neither
•Write an example of a rational function that models given characteristics
•Solve problems and sketch graphs involving rational functions

Unit 9 Assignments:

•Homework
•Quizzes
•Classwork Task: The Breaking Point: Using Rational Functions to Solve Problems
•End of Unit Test

Unit 9 Task: Start Applying Yourself, Rational Function!: Using Rational Functions to Solve Problems

In this task, a vinegar and oil mixture for salad dressing, the average cost per month for cable television, grams of chocolate in trail mix, and a lightning/ thunderstorm are all situations that are modeled by using rational functions. Students will answer questions related to each scenario, create ratios, write rational expressions, describe the behavior of the ratios, and identify the domain and range.

Unit 10 - Solving Rational Equations

Unit 10 Overview:

This chapter provides opportunities for students to connect their knowledge of operations with rational numbers to operations with rational expressions. Lessons provide opportunities for students to analyze and compare the process to add, subtract, multiply, and divide rational numbers to the same operations with rational expressions. Students conclude rational expressions are similar to rational numbers and are closed under all the operations. In the later part of the chapter, lessons provide opportunities for students to write and solve rational equations and list restrictions. Student work is presented throughout the chapter to demonstrate efficient ways to operate with rational expressions and efficient ways to solve rational equations based on the structure of the original equation.

Unit 10 Students Will Learn To:

•Calculate the least common denominator for a rational expression and list any domain restrictions
•Determine the sum or difference for rational expressions
•Determine the sum or difference for rational expressions and describe any variable restrictions
•Multiply and divide rational expressions
•Multiply rational expressions and describe any variable restrictions
•Determine quotients and describe any variable restrictions
•Solve rational equations using proportional reasoning and describe any restrictions for the value of x
•Solve rational equations using the least common denominator and describe any restrictions for the value of x or extraneous roots
•Solve rational equations with or without a graphing calculator and describe any restrictions for the value of x
•Write and solve a rational equation to model various work, mixture, and distance scenarios
•Write and solve a rational equation or inequality to model various cost scenarios

Unit 10 Assignments:

•Homework
•Quizzes
•Classwork Task: Things Are Not Always as They Appear: Solving Rational Equations
•End of Unit Test

Unit 10 Task: Seeing Structure: Solving Rational Equations

In this activity, students will sort 12 equation into piles according to the method in which they could solve them. They will solve the equations and list the domain restrictions for each problem.

Unit 11 - Radical Functions

Unit 11 Overview:

This chapter presents opportunities for students to explore radical functions, simplify radical expressions, and solve radical equations. The chapter begins with an introduction to radical functions as inverses of power functions. Students will graph radical functions, write their equations, and determine their key characteristics. Lessons then expand on this knowledge for transformations of radical functions. In the later part of the chapter, lessons provide opportunities for students to rewrite radicals using rational exponents and extract roots from radical expressions. Students will also multiply, divide, add, and subtract radical expressions. Finally, students will analyze solution strategies for radical equations, and solve real-world problem situations using radical equations.

Unit 11 Students Will Learn To:

•Use the Vertical Line Test to determine whether graphs of relations are functions
• Sketch graphs of inverses of functions
•Use the Horizontal Line Test to determine whether graphs of functions are invertible
•Determine whether functions are invertible without graphing
• Determine the equation for inverses of functions
•Identify domains, ranges, x-intercepts, and y-intercepts of functions
•Use compositions to determine whether two functions are inverse functions
•Use radical equations to answer questions about problem scenarios
•Sketch transformations of the square root function and write equations for transformed functions
•Sketch transformations of the cube root function and write equations for transformed functions
•Describe transformations to given functions that create new given functions
•Write equations for functions given original functions and descriptions of transformations
•Describe how transformations change domains of functions
•Rewrite expressions using rational exponents
•Rewrite expressions using radicals
•Simplify radical expressions
•Add, subtract, multiply and divide radical expressions and extract roots
•Solve radical equations and check for extraneous solutions
•Solve radical equations to answer questions about problem scenarios

Unit 11 Assignments:

•Homework
•Quizzes
•Classwork Task: Making Waves: Transformations of Radical Functions
•End of Unit Test

Chapter 11 Task: Analyzing Solution Paths for Radical Equations: Solving Radical Equations

In this task, students will compare the different solutions to worked examples of solving a two-step quadratic equation and a two-step radical equation. They will analyze student work to identify errors in the solution path, and will solve several radical equations checking for extraneous solutions.

Unit 12 - Graphing Exponential & Logarithmic Functions

Unit 12 Overview:

This chapter presents opportunities for students to analyze, graph, and transform exponential and logarithmic functions. The chapter begins with an exploration of exponential functions. Students will analyze key characteristics of exponential functions and graphs. Lessons then expand on this knowledge for transformations of exponential functions. In the later part of the chapter, lessons focus on logarithmic functions. Student will determine key characteristics of logarithmic functions and graphs. Students will also transform logarithmic functions and make generalizations about the effect of a transformation on an inverse function.

Unit 12 Students Will Learn To:

•Write explicit formulas for geometric sequences and determine the 10th term
•Write exponential functions to represent geometric sequences and evaluate each function for a given n
•Write exponential functions to represent half-life situations and complete a table of values
•Identify functions as exponential growth or decay functions
•Complete tables and graph exponential functions
• Write exponential functions with given characteristics
• Use the formula for compound interest & population growth to answer questions
•Complete tables to determine corresponding points on a function given reference points, graph the function, and state the domain, range, and asymptotes
•Describe transformations performed on f(x) to create g(x) and write an equation for g(x) in terms of f(x)
• Write exponential equations as corresponding logarithmic equations and vice versa
• Graph the inverse of exponential functions and describe the domain, range, asymptotes, and end behavior
• Solve logarithmic equations
•Analyze graphs, describe the transformations performed on f(x) to produce g(x), and write an equation for g(x)
•Use the graph of f(x) to sketch the transformed function m(x) and state the domain, range, and asymptotes of m(x)
•Write a transformed logarithmic function c(x) in terms of f(x), given characteristics
•Given f(x) and the transformed function g(x), write an equation for $g^{-1}(x)$ in terms of $f^{-1}(x)$
•Complete tables for transformations, write the equation for the transformation function in terms of $f^{-1}(x)$,
and identify the transformation on f(x) and its inverse
• Given f(x), write an equation for the inverse function $f^{-1}(x)$

Unit 12 Assignments:

•Homework
•Quizzes
•Classwork Task: We have Liftoff! Properties of Exponential Graphs
•End of Unit Test

Unit 12 Task: I've Got the Power: Properties of Exponential Graphs

In this activity, students cut out six graphs and six equations. They sort the cut-outs into "growth" or "decay" functions, tape them onto a graphic organizer, complete a table of values for each function, and analyze the graphs. Students discuss a rule that determines whether a function is an example of exponential growth or exponential decay and explain their reasoning. Students write exponential functions with given characteristics, and complete a table that summarizes the characteristics for the basic exponential growth and exponential decay functions.

Unit 13 Exponential & Logarithmic Equations

Unit 13 Overview:

In this chapter, students use their understanding of exponential and logarithmic functions to solve exponential and logarithmic equations. Students begin by building understanding and fluency with exponential and logarithmic expressions, including estimating the values of logarithms on a number line and then use this understanding to derive the properties of logarithms. Students explore alternative methods for solving logarithmic equations and solve exponential and logarithmic equations in context.

Unit 13 Students Will Learn To:

•Arrange terms to create true exponential and logarithmic equations
•Solve for unknowns in logarithmic equations
• Estimate logarithms to the tenths place
•Determine the appropriate unknown base in logarithmic equations
•Use properties of logarithms to write logarithms in expanded form
• Write logarithmic expressions as single logarithms
•Write logarithmic expressions as algebraic expressions
•Use the Change of Base Formula to solve exponential equations
•Solve exponential equations using properties of logarithms
•Solve exponential equations and explain methods of solving
• Solve logarithmic equations and check answers
•Use properties of logarithms to solve equations and check answers
•Use logarithms to solve half-life problems
•Use exponential equations and formulas to solve problems in context
•Use the logarithmic formula for the magnitude of an earthquake to solve problems
•Use various logarithmic formulas to solve problems

Unit 13 Assignments:

•Homework
•Quizzes
•Classwork Task: Log of Both Sides? Solving Exponential Equations
•End of Unit Test

Unit 13 Task: Log of Both Sides: Solving Exponential Equations

In this task, Students use two different strategies to solve logarithmic equations: equal bases and equal logarithms result in equal arguments, and equal logarithms and equal arguments result in equal bases. Students review and discuss student work that shows each step related to solving various exponential equations. In the last part of this task, students solve exponential equations and describe the reasoning behind the strategy they used in each.

Unit 14 - Modeling with Functions

Unit 14 Overview:

In this chapter, students explore various real-world and purely mathematical situations that are modeled with functions. Function composition is developed, and students apply function composition to solve contextual problems. Students also use functions to draw graphics, to model optimal solutions and self-similarity, and to study situations modeled by logistic growth, such as the spread of infectious diseases. Students end the chapter by choosing appropriate functions to model a variety of problem situations.

Unit 14 Students Will Learn To:

•Determine the values of composition functions using graphs of f(x) and g(x)
•Evaluate composition functions using the equations of f (x) and g(x)
• Given a pair of functions, determine f(g(x)) and g(f (x))
•Use composition of functions to determine whether two functions are inverses of each other
• Determine the composition of two functions and state the domain
• Determine the function family represented by a graph
•Identify the domain of a graphed function
• Given a domain, write the equation of a graphed function
•Graph a function over a given domain
•Write a system of inequalities to represent the constraints for given problem situations
•Graph a system of inequalities represented by given constraints
•Calculate the maximum and minimum values of a function given the intersection points of the constraints
•Maximize or minimize a function in quadratic form
•Based on a graph, determine the initial growth stage, the exponential growth stage, the dampened growth stage, and the equilibrium stage, as well as the carrying capacity of a logistic function
• Use regression to determine the logistic equation for a set of data
•Use a logistic growth function to calculate the value of x or y
•Write an expression that represents the geometric sequence shown in a table
•Determine the indicated regression equation given a set of data
•Graph a set of data and then determine the appropriate regression equation
•Use a given function to calculate values in a real-world problem situation
•**Interpret graphs of various functions and model them in real world situations.**

Unit 14 Assignments:

•Homework
•Quizzes
•Classwork Task: Calm, Cool, and Composed: Composition of Functions
•Project:
•End of Unit Test

Unit 14 Tasks: Extreme Couponing and Calm, Cool and Composed: Composition of Functions

In these tasks, students evaluate the composition of two functions. Students identify errors in the reasoning of others through sample work and then determine the correct composite function. The identity function is defined and students use the composition of functions to determine whether the given functions are inverses of each other. A function, composed of two others, are given and students determine the two function that were used to generate the the original function.

Unit 15 - Trigonometric Functions

Unit 15 Overview:

This chapter begins with a problem situation involving a Ferris wheel in which students explore how periodic functions are built. Lessons provide opportunities for students to analyze the graphs of periodic functions for characteristics such as the maximum, minimum, period, amplitude, and midline. Students will explore the unit circle to understand radian measure and convert between angle measures in degrees and radians. Using new understanding of the unit circle, radian measure, and periodic functions, students will investigate the sine and cosine functions as well as their characteristics and graphs. In the later part of the chapter, students recall the transformational function form $g(x) = Af(B(x - C)) + D$ to graph and analyze transformations of the sine and cosine functions and build a graph of the tangent function using a context. Students will analyze the characteristics of the tangent graph, and apply their knowledge of transformations to sketch graphs of transformed tangent functions.

Unit 15 Students Will Learn To:

•Sketch graphs of periodic functions that represent given scenarios
•Determine whether graphs represent periodic functions
• Determine midlines and amplitudes of graphs of periodic functions
•Calculate radian measures of central angles given degree measures and radii measures
• Estimate degree measures of central angles given degree measures
•Convert radian measures to degree measures and vice versa
•Use the unit circle to determine sine and cosine values of given radian measures
•Given radian angle measures, determine the coordinates of the point at which the terminal ray intersects the unit circle
•Evaluate the sine and cosine of the supplements of given radian measures
•Determine amplitudes, periods & frequencies of sine and cosine graphs
•Describe transformations of graphs given equations of basic sine and cosine functions and equations of transformed functions
•Use knowledge of transformations to sketch graphs of given equations of sine and cosine functions
•Calculate tangent of angles given the cosine and sine of angles
•Evaluate tangent functions using sine and cosine functions
•Analyze graphs of transformed tangent functions and determine the equations of the transformed tangent functions
•Graph transformations of tangent functions
•Graphs of secant, cosecant and cotangent functions.
•Simplify trigonometric identities.

Unit 15 Assignments:

•Homework
•Quizzes
•Classwork Task: An Angle Measure by Another Name: Radian measure
•End of Unit Test

Unit 15 Task: An Angle Measure by Another Name: Radian Measure

In this task, students determine the measure of an arc of a circle and the length of its intercepted arc. Students write expressions in terms of the radius to describe the arc length for a central angle measure. The term unit circle is introduced. Students use a protractor to determine the measure of central angles in the unit circle and their corresponding arc lengths. The term radian is defined and students label the measure of several central angles on a unit circle in degrees and radians.

Unit 15 Enrichment:

In this activity, students will explore the relationships between the graphs of tangent, co-tangent, secant and cosecant. Students will explore the discontinuities of these functions as they relate to the identity ratios, e.g. tan(x) = sin(x)/cos(x). They will also explore the periodicities of these functions and their relation to a parameterization of the unit circle.

Resources:

Interactive Mathematics Website

Precalculus: Graphical, Numerical, and Algebraic 7th edition, Demana, Waits, Foley and Kennedy

Unit 16 - Trigonometric Equations

Unit 16 Overview:

In this chapter, students are introduced to solving trigonometric equations. They use their knowledge of the unit circle, radian measures, and the graphical behaviors of trigonometric functions to solve sine, cosine, and tangent equations. Finally, students explore the damping function and modeling with trigonometric transformations.

Unit 16 Students Will Learn To:

•Use the graph of a trigonometric function and domain restrictions to solve an equation
•Solve a trigonometric function over a given domain
•Use a periodicity identity to list four solutions to a trigonometric equation
• Solve a trigonometric equation over the set of all real numbers
•Determine the period of a trigonometric equation and then solve the equation over all real numbers
•Solve a trigonometric equation of quadratic form over the set of all real numbers
•Use the Pythagorean identity to determine the exact value of a trigonometric function
•Sketch the graph of a population model
•Determine the amplitude, period, phase shift, and vertical shift of a function given its equation
•Identify the amplitude, period, phase shift, and vertical shift of a function in the context of a problem situation
•Write the equation of a trigonometric function given its graph
•Write a sinusoidal regression equation for a set of data
•Compare and contrast the characteristics of two sinusoidal models in terms of a problem situation
•Identify the equation for the midline of a graph, based on a contextual situation
•Determine the minimum, maximum, and amplitude of the function of a problem situation
•Determine the period and B-value of the function of a problem situation
•Modeling motion with a trigonometric equation.
•Solve trigonometric equations involving secant, cosecant and cotangent functions.

Unit 16 Assignments:

•Homework
•Quizzes
•Classwork Task: You Know A Lot: Solving Trigonometric Equations
•End of Unit Test

Unit 16 Task: You Know A Lot: Solving Trigonometric Equations

In this task, the term trigonometric equation is defined. Students will analyzed worked examples to show how restrictions on the domain affect the solution(s) and will use a graph to determine the solution(s). Students will use periodicity identities to determine multiple solutions.

Unit 16 Enrichment:

Connections between the 6 trigonometric functions will be developed in this enrichment through the examination of the fundamental trigonometric identities. Students will examine the domains and ranges of these functions and will derive two of the Pythagorean identities for trigonometric functions from the identity: $\sin^2(\theta)+\cos^2(\theta)=1$. They will also explore simplifying various trigonometric identities and solving trigonometric equations algebraically.

Resources: Precalculus: Graphical, Numerical, and Algebraic 7th edition, Demana, Waits, Foley and Kennedy

Classwork

Daily classwork is designed around structured tasks. The lessons involve opportunities for students to work individually and cooperatively, to make sense of problems and persevere in solving them, reason abstractly and quantitatively, construct viable arguments and critique the reasoning of others, model with mathematics, use appropriate tools strategically, attend to precision, look for and make use of structure, and look for and express regularity in repeated reasoning. Students will share their mathematical thinking, and develop their ability to think critically and problem solve. Students will daily use at least one of the eight Standards of Mathematical Practice.

Homework

Homework will be given for each lesson in Integrated Math III and will be used to reinforce newly learned concepts and to review previously learned concepts.

Instructional Strategies:

A variety of instructional strategies will be used throughout Integrated Math III. Instructional strategies will be utilized during whole group instruction, small group instruction, partner/pair work, and individual work. The key goal of instruction is to challenge students to think about and discuss mathematics while using the eight Standards for Mathematical Practice.

Instructional Methods/Strategies:

•Guided Inquiry/Problem Based Learning •Direct Instruction •Cooperative Learning Structures •Discourse •Use of Visual Representations and Concrete Models

Guided Inquiry:

The standards for Mathematical Practice emphasize the importance of making sense of problems and persevering in solving them (MP 1), reasoning abstractly and quantitatively (MP 2), and solving problems that are based upon everyday life, society, and the workplace (MP 4). Implicit instruction models such as guided inquiry provide students with the time and support to successfully engage in mathematical inquiry by collecting data and testing hypothesis. During guided inquiry, the teacher provides the data and then questions students to help them arrive at a solution to the problem. The teacher utilizes this strategy throughout each unit to encourage students to explore and make sense of mathematical situations. Content especially suited to the use of this strategy involves functions with patterns and geometric relationships.

Problem Based Learning:

In problem based learning, the teacher poses a problem or question, assists when necessary, and monitors students' methods and solutions. During the use of this strategy students work either individually or in cooperative groups to solve challenging problems with real world applications Throughout problem-based learning teachers encourage students to think for themselves and show resourcefulness and creativity. When students engage in problem solving they must be allowed to make mistakes. The teacher creates a classroom environment that recognizes errors and uncertainties as inevitable accouterments of problem solving. Through class discussion and feedback, student errors become the basis of furthering understanding and learning. Problem based learning will be utilized during the introduction of a concept as well as at the end of a unit of study.

Direct Instruction:

Direct instruction is highly structured and sequential strategy. It is effective for teaching information and basic skills during whole class instruction. In the first phase the teacher introduces, demonstrates, or explains the new concept or strategy, asks questions, and checks for understanding. The second phase is an intermediate step designed to

result in the independent application of the new concept or described strategy. In the relatively brief third phase students work independently and receive opportunities for closure. This phase also often serves in part as an informal assessment of the extent to which students understand what they are learning and how they use their knowledge or skills in the larger scheme of mathematics.

Cooperative Learning:

The cooperative learning model involves students working either in partners or in mixed ability groups to complete specific tasks. It assists teachers in addressing the needs of the wide diversity of students that is found in many classrooms. The teacher presents the group with a problem or a task and sets up the student activities. While the students work together to complete the task, the teacher monitors progress and assists student groups when necessary. Cooperative Learning structures will be used in Integrated Math 1 within each unit to introduce concepts, practice important skills, and review key content.

Discourse:

Throughout this course the teacher will facilitate classroom discussions to support student understanding. The Standards for Mathematical Practice expect students to demonstrate competence in making sense of problems (MP 1), constructing viable arguments (MP 3), and modeling with mathematics (MP 4). Through discourse in the mathematics classroom, students will be expected to communicate their understanding of mathematical concepts, receive feedback, and progress to deeper understanding. The teacher will use facilitation techniques such as rephrasing student comments, allowing wait time, and asking students to revoice peer statements. These discussions will support students as they relate the everyday language of their world to mathematical language and symbols. Mathematical discourse will be an essential component of each unit of study and will provide detailed information to the instructor regarding student understanding and progress.

Visual Representations and Concrete Models:

Visual representations and models will be utilized to support student understanding of key content standards. The teacher will model effective use of diagrams, concept maps, graphic organizers, and flow charts to show relationships between concepts and develop deeper understanding. Learning that utilizes different modes of instruction is necessary to promote both student understanding and long-term memory. The Mathematical Practice Standards suggest that students look for and make use of structure (MP 7), construct viable arguments (MP 3), model with mathematics (MP 4), and use appropriate tools strategically (MP 5). In order to develop these mathematical habits, the teacher will emphasize meaningful relationships that connect concepts, utilize concept maps and graphic organizers to summarize lesson content and objectives, and facilitate student use of models and representations to demonstrate understanding. For example, teachers will use models to demonstrate the Pythagorean Theorem, utilize algebra tiles to demonstrate an algebraic expression, and use Angles to demonstrate triangle congruencies.

Standards for Mathematical Practice

Supporting Mathematical Practice 1: Make sense of problems and persevere in solving them

In Integrated Math III, students will discuss, think, work in groups, and share, which provides a classroom environment for students to make sense of problems, develop strategies, persevere in implementing the strategy, and analyze the results.

As students work collaboratively through problems, they will plan and execute a solution strategy. Each group member has the responsibility to monitor and evaluate the progress of the group, and to make suggestions for changing course, if necessary. Teachers will circulate through the room monitoring students' work, assessing progress, and redirecting with guided questions.

To bring closure and provide summary for each problem, teachers will ask thought-provoking questions that require students to explain their thinking and process. Multiple groups will present their solutions with class discussion centered on alternate solution paths, connections to prior concepts, and generalizations.

Supporting Mathematical Practice 2: Reason abstractly and quantitatively

Throughout the course, scenarios will help students recognize and understand that quantitative relationships seen in the real-world are no different than quantitative relationships in mathematics. Some problems begin with real-world context to remind students that the quantitative relationships they already use can be formalized mathematically. Other problems will use real-world situations as an application of mathematical concepts.

Supporting Mathematical Practice 3: Construct viable arguments and critique the reasoning of others

In Integrated Math III classrooms, students are active participants in their learning; they are doing the work, presenting solutions, and critiquing each other. The teacher facilitates the discussion and highlights important connections, strategies, and conclusions.

Each lesson ends with the statement "Be prepared to share your solutions and methods." Students are expected to be able to communicate their reasoning and critique the explanation of others. As students explain problem-solving steps or the rationale for a solution, they will internalize the process and reasoning behind the

mathematics.

Supporting Mathematical Practice 4: Model with mathematics

Activities throughout the course provide opportunities for students to create and use multiple representations (words, tables, graphs, and symbolic statements) to organize, record, and communicate mathematical ideas.

Manipulatives and various models are incorporated throughout to develop a conceptual understanding of mathematical concepts. These activities provide opportunities for students to develop strategies and reasoning that will serve as the foundation for learning more abstract mathematics. To foster the transfer of student understanding from concrete manipulatives to the abstract procedures, a variety of instructional prompts are used.

Supporting Mathematical Practice 5: Use appropriate tools strategically

In Integrated Math III, activities throughout the course facilitate the appropriate use of tools including graphing calculators, rulers, protractors, compasses, and manipulatives. Tools are used in a variety of ways to build conceptual understanding, to explore concepts, and to verify solutions. Worked examples are provided as appropriate within lessons to demonstrate how to use various tools.

Supporting Mathematical Practice 6: Attend to precision

Each lesson throughout the course provides opportunities for students to communicate precisely when writing their solutions, and then sharing their solutions with their peers. Teachers ensure that students label units of measure and explain their reasoning using appropriate definitions and mathematical language.

Supporting Mathematical Practice 7: Look for and make use of structure

Activities throughout the course provide opportunities for students to analyze numeric, geometric, and algebraic patterns. Accompanying questions help students notice relationships for themselves as opposed to memorization of facts.

Supporting Mathematical Practice 8: Look for and express regularity in repeated reasoning

During activities throughout the course, students are provided opportunities to make observations, notice patterns, and make generalizations. Students are required to communicate their generalizations verbally and symbolically. This understanding will lead to greater transfer and ability to solve non-routine problems. In addition, teachers will facilitate discussions that highlight important connections, efficient strategies, and conclusions.

Assessment Methods and/or Tools:

A combination of both informal, formal, informative and summative assessments will be used to evaluate student progress towards students' ability to think mathematically, developing students' conceptual understanding of mathematics, and developing students' procedural fluency in mathematics

•Daily Student Observation •Formal Daily Assessment •Performance Tasks •End of Unit Test •Projects •Quizzes •Semester Final Exam

Daily Student Observation

Daily student observations are in class observations of students working on mathematics tasks, either independently or in groups. Walking around the room, actively listening to students, asking questions, directing discourse, and helping where needed are all forms of informal assessment. The instantaneous feedback to students about where to go next, what question they may want to ask themselves to gain insight into a problem, or simply correcting computational errors, results in this practice being a form of formative assessment. Teachers may use notes or they may focus their observations using checklists based on specific skills and concepts. In addition to notes and checklists, teachers may also use student whiteboards, Thumbs Up/Thumbs Down, or Fist to Five, to informally determine student understanding of the concept being taught.

Formal Daily Assessment

Formal Daily Assessments are both in classroom and out of classroom assessments that teachers use to check for understanding. These assessments are typically done at the end of a lesson to see how much the students have learned. Examples of formal daily assessments are homework, classwork, and Ticket out the Door. These types of assessments are formative because teachers use these assessments to gauge student understanding of the concept, procedure, or skill. Based on student results teachers modify lessons to meet the needs of their students.

Performance Tasks

Performance Tasks consist of problems or scenarios that demand students engage in thinking about a problem, encourage them to justify their thinking, and often require students to engage with other students. Administered to individual students or to groups, performance tasks are often complex problem solving activities that require students to apply prior knowledge in a given situation or to extend current knowledge in new directions.

Both closed tasks and open tasks are used in Performance Tasks. Closed tasks will ask students to provide one correct answer and usually there is only one correct way to reach that answer. In Integrated Math III, closed tasks will be used to evaluate student procedural fluency in mathematics. Open tasks will come in two forms, open-middled tasks and open-ended tasks. Open-middled tasks require one correct answer; however, students may provide different paths to the answer. Open-middled tasks are effective in assessing how students solve problems and think about mathematics. They reveal student thinking throughout the problem solving process and they give

students the opportunity to develop and use their own strategies and to solve problems in ways that are most comfortable to them. Open-ended tasks have many correct answers and many correct routes to getting those answers. They include tasks that require students to make conjectures, solve non-routine problems, and justify their answers. Open-ended tasks often pose questions based in real situations, thereby giving the students a chance to see how mathematics is used outside the classroom. They often require students to make many decisions about using mathematics and sometimes require students to make assumptions and add pertinent information. They provide teachers with the opportunity to see how their students make problem-solving decisions and how they use the mathematics they have learned. Open-ended tasks also give students the opportunity to be creative and use their own ideas for solving problems. In Integrated Math 1, open tasks will be used to assess students' problem solving ability and conceptual understanding.

The Performance Tasks will be evaluated according to unit goals and objectives.

End of Unit Test:

End of Unit Tests measure student learning of the content and skills in a unit. Such tests are linked to the specific learning goals of each unit (see course outline), the California Common Core Mathematics Standards for Integrated Math III, and pay attention to the Standards for Mathematical Practice. To effectively assess such goals, such tests should include various types of assessment items, including multiple choice, selected response, short answer, and both closed tasks and open-middled tasks (see Performance Tasks above). End of Unit Tests will be given at the end of each unit.

Projects:

Projects are another form of formal assessment that will be used in Integrated Math III. Projects are typically extended open-ended tasks. Like open-ended tasks, projects have many solutions with many routes to the solutions, but they require many more decisions from students and projects typically will require students to work for a week or more. Projects focus on situations outside of school that require students to use different types of mathematics, such as algebra, geometry, or probability in the same task. Also, they connect mathematics to other subjects, such as language arts, science, social studies, art, or music.

Projects allow students to see mathematics in action outside the classroom by giving students a chance to connect mathematics with real situations and other subject areas. They also allow teachers to assess how students think, how our students persevere, and how they connect ideas. If presentations are part of the project, teachers are also able to see how students communicate mathematics orally.

Quizzes:

In Integrated Math III, quizzes are used as formative assessments as part of a unit of study. Quizzes are linked to specific subset of learning goals within a unit of study, the California Common Core Mathematics Standards for Integrated Math 1, and pays attention to the Standards for Mathematical Practice. To effectively assess such goals, quizzes should include various types of assessment items, including multiple choice, selected response, short answer, and both closed tasks and open-middled tasks (see Performance Tasks above). A minimum of two quizzes will be given per unit.

Semester Final Exams

Semester Final Exams are summative assessments designed to measure student learning of the content and skills learned in a semester. Such exams are linked to the specific learning goals of each unit taught in the semester, the California Common Core Mathematics Standards for Integrated Math III, and the Standards for Mathematical Practice. To effectively assess such goals, these tests will include various types of assessment items, including multiple choice, selected response, short answer, and both closed tasks and open-middled tasks (see Performance Tasks above). Semester Final exams will be given twice a year, at the end of both Fall and Spring semesters.

14. Course Overview [Provide a brief summary/snapshot (3-5 sentences) of the course's content]:

Integrated Math III Honors is the third course of a three-course sequence including Integrated Math I Honors, Integrated Math II Honors, and Integrated Math III Honors. This course is designed for students who have demonstrated an advanced level of interest and achievement in mathematics. This course satisfies the New California Standards for Integrated Math III and is intended for all eleventh graders. In this course, students expand their concept of functions to include polynomial, rational, and radical functions. They also expand their knowledge of right-triangle trigonometry to include general triangles through the Law of Sines and the Law of Cosines. This process naturally leads to the development of the concept of radian measure and trigonometric functions across the domain of real numbers. In Integrated III Honors, students will extend the domain of trigonometric functions using the unit circle, model periodic phenomena with trigonometric functions, and prove and apply trigonometric identities. Students understand the similarities between the system of polynomials and the system of integers. For example, students see analogies between polynomial arithmetic and base-ten computations. Students extend their work with exponential functions to include solving exponential equations with logarithms. They explore the effects of transformations on graphs of diverse functions. Students expand upon their foundational work of statistical visual displays to identify different ways of collecting data. As the capstone of the three-year course sequence, Integrated Math III Honors students apply knowledge of functions, statistics, and geometry in a modeling context. The purpose and goal of participating in the Honors track is to be ready to go into Calculus upon completion of the three year sequence.
The purpose of Integrated Math III Honors is to develop students' abilities to expand students' mathematical repertoire gained in the Integrated Math II Honors Course. In doing this, students have multiple opportunities to engage with the Standards for Mathematical Practice (SMPs). A central objective of this endeavor is to experience mathematics as a coherent, relevant, and meaningful subject by encouraging students to see relationships between various conceptual categories and systems. Integrated Math III Honors will extend the mathematics students learned in Integrated Math II Honors and earlier grades through the analysis of models/real-world situations, manipulatives, graphs, and diagrams. Students will see structure in expressions. In addition, students will learn to solve problems graphically, numerically, algebraically, and verbally and make connections between these representations. Students in this course will apply mathematical models to understand real world events and situations. They will use algebraic, geometric, and statistical reasoning to manipulate these models for deeper learning. Objectives in bold delineate honors standards.
*Adapted from California Math Framework Mathematics III

15. Texts and Supplemental Instructional Materials *(all non-core instructional materials are the responsibility of individual schools to purchase.)*

Texts: Carnegie Learning Integrated Math III

Supplemental Materials: Precalculus: Graphically, Numerical, Algebraic 7th Edition Demana, Foley, Kennedy, Waits

16. Will this course be submitted for approval by UC? Yes

Section 2: School and District Information

School Information

1. School Name:

School District: Palm Springs Unified School District

City and State: Palm Springs, California District Web Site: http://www.psusd.us

School Course List Contact Information (Name of AP of Curriculum or Principal)

2. Name: Anne Kalisek

Position/Title: Director of Curriculum & Instruction Email: akalisek@psusd.us

Phone #: 760-416-6024 Ext:

Teacher Contact Information (Name of teacher/administrator who authored this course)

3. Name: Tom Bystrzycki

Position/Title: Math TOSA Email: tbystrzycki@psusd.us

Phone #: 760-416-6024 Ext.

Palm Springs Unified School District
Secondary Course Description

Section 3: Course Information

1. Was this course "Previously Approved" by UC? No

Note: if this course is to be submitted to UC and it was "Previously Approved," the exact same course title as the previously approved course must be used. Compete outlines are not needed for courses previously approved by UC. Courses that are defined as "previously approved" are courses from the following programs (Advanced Placement, International Baccalaureate, ROP courses, etc.), or courses from within the same district, or courses that have been removed within a three-year window are being reinstated, and/or courses from UC-approved online providers. Courses modeled after courses from outside the school district are also defined as "previously approved" but a complete course description will be required for submission to UC. Each section below represents an individual page on the UC electronic submission site.

If "No," proceed to the Course Description Section (Section 4).

If "Yes," indicate which category applies:

2. Is this course modeled after a UC-approved course from another high school outside of our district? No

Note: If "Yes," you will be required to submit a complete course description. UC will review the previous submission, if it is available, to assist them in their review process.

If "Yes," list which school: _____

Exact Course Title: _____

3. Is this course modeled after an identical course approved by UC for the current year at another high school in PSUSD: No

If "Yes," what school? _____

Exact Course Title: _____

4. Is this course being reinstated after removal within 3 years: No

If "Yes," what year was the course removed from the list? _____

Exact Course Title: _____

5. Has this course been provided program status, is not an online course, and is it listed below? No

If "Yes," select an option from the Program Status list: -- _____

6. If "Advanced Placement," has it been authorized by the College Board through the AP audit process? --

Note: UC will only allow Advanced Placement courses that have passed or are in the AP audit process. UC requires all AP courses on your list, including those approved in prior years, to be verified via the College Board AP audit process. UC will run quarterly reports based on AP Audit data. AP courses not listed on the AP audit list will be removed.

If "In Progress," date submitted to AP: _____

MM/DD/YYYY

Exact Program Course Title: -- _____

7(a). Is this course provided by one of the UC-approved online curriculum providers listed in #8? No

7(b). Have you signed the appropriate partnership agreement with the provider regarding methods of delivery and instruction? No

Note: You must have signed an agreement with the appropriate provider and filed with UC in order to use their courses.

8. If the answer to either 7(a) or (b) is "No," UC will not approve this course. If "Yes" to both 7(a) and (b)., then select the appropriate option from the Online Provider List below:

--

9. Seeking "Honors" Distinction

Note: To receive "Honors" distinction for both UC and PSUSD, the course content must satisfy certain requirements. For information about these requirements, refer to the a-g Guide: http://www.ucop.edu/a-gGuide/ag/a-g/honors.html. For "Previously Approved" courses (including AP and IB), the honors information will be pre-populated as applicable on your UC submission template.

Yes, Other Honors

Note: "Other Honors" is defined by UC as a course specifically designed with distinctive features which set it apart from regular high school courses in the same discipline areas. The course should be seen as comparable in terms of workload and emphasis to AP, IB or introductory college courses in the subject. Honors courses must be designed for the 11th and 12th grade level to be UC approved and require a comprehensive, year-long written final exam. In addition to AP and IB higher level courses, ***high schools may certify not more than one honors level course per grade level in each of the following subject areas only: history, English, advanced mathematics, each laboratory science course, each language other than English, and each of the four VPA disciplines.*** *If there are no AP or IB or higher level courses in a given subject area, the high school may certify up to, but not more than two honors level courses in that area.*

10. Subject Area and Category

"a"- History/Social Science

--

"b"- English

--

"c"- Mathematics

Integrated Math 3

"d"- Laboratory Science

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Note: Students electing to enroll in an integrated-science program (ISP) are strongly advised by UC to complete the entire three-year sequence. In most cases, the first year of an integrated science sequence fulfills only the "g" elective requirement: the second and third years of the sequence then fulfill the two-year "d" laboratory science requirement. Accordingly, if only ISP 1 and only one of ISP 2 or ISP 3 are completed, then one additional course from the categories of Biology, Chemistry, or Physics from the "d" subject area must be taken to fulfill the "d" requirement.

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Note: This category demonstrates that the course is cross-disciplinary and is often used for advanced science courses such as AP Environmental Science or Biochemistry

"e"- Language Other than English

--

Language --

"f"- Visual and Performing Arts

--

"g"- Elective

--

Palm Springs Unified School District
High School Course Description

Section 4: Course Attributes

1. Is this course classified as a Career Technical Education Course?

No

If no, skip item #2

2. If "Yes," select the name of the industry **and** Career Pathway:

____	Agriculture and Natural Resources	--
____	Arts, Media, and Entertainment	--
____	Building and Construction Trades	--
____	Business and Finance	--
____	Education, Child Development and Family Services	--
____	Energy, Environment, and Utilities	--
____	Engineering and Architecture	--
____	Fashion and Interior Design	--
____	Finance and Business	--
____	Health Science and Medical Technology	--
____	Hospitality, Tourism, and Recreation	--
____	Information and Communication Technologies	--
____	Manufacturing and Product Development	--
____	Marketing, Sales, and Service	--
____	Public Services	--
____	Transportation	--