Orange Board of Education
Pre-Calculus
Scopes & Sequences

ORANGE PUBLIC SCHOOLS 2015 - 2016

OFFICE OF CURRICULUM AND INSTRUCTION

OFFICE OF MATHEMATICS

Cycle I:

Topic: Units 1-2. Functions, Polynomial and Rational	**Skills:** • Determine if a relationship represents a function • Evaluate the value of a function • Determine the domain and range of a function • Evaluate, oven a given interval, the average change of a function • Determine intervals where a function is increasing, decreasing, and constant • Determine the inverse of a function, and whether a function is 1 to 1 • Evaluate combinations of and composite functions • Determine if a function is odd, even, or neither, both graphically and algebraically • Graph the 8 basic parent functions • Graph, read, and evaluate piecewise-defined functions • Understand how transformations are represented, both in equations and in graphs • Sketch functions based off their parent functions and corresponding transformations • Identify key characteristics of parent functions, using domain, range, maxima and minima, and intervals of increasing and decreasing • Solve real-world problems using a variety of functions • Examine equations of polynomial functions to determine left and right end behavior • Identify the zeros of a polynomial function and its multiplicity • Identify the domain, range, and degree of polynomial functions • Analyze the graphs of polynomial functions with respect to turning points, zeros, and end behavior • Form polynomials from zeros and graphs • Divide polynomials with long and synthetic division • Compare and contrast the properties of real and imaginary numbers • Perform arithmetic operations on complex numbers. • Find the real and complex zeros of a polynomial • Find the domain, and the vertical and horizontal asymptotes of a rational function	**Projected # of days:** 45 (23 block)

Cycle 2:

Topic: Units 3-4. Exponential and Logarithmic Functions, Trigonometry	**Skills:** • Evaluate exponential functions • Graph exponential and logarithmic functions • Define the number *e* • Define the domain and range of exponential and logarithmic functions • Change exponential expressions to logarithmic expressions and vice-versa • Expand logarithmic expressions • Condense logarithmic expressions into a single expression • Use properties of logarithms and exponents • Solve problems using any base • Solve real world problems involving interest, growth, and decay • Define the six trigonometric ratios of an angle • Evaluate trigonometric ratios using triangles and/or calculators • Solve triangles (including unknown sides and/or angles) using trigonometric ratios • Convert from radians to degrees and vice-versa • Define trigonometric functions in terms of the unit circle • Prove and work with basic Pythagorean identities • Identify co-terminal and reference angles using degrees and radians • Graph the basic trigonometric functions • Graph the sine, cosine, cosecant, and secant functions • Graph transformations of these basic functions	**Projected # of days:** 45 (23 block)

Cycle 3:

Topic: Units 5-6 Solving Trigonometric Equations and Trigonometric Applications	**Skills:** • State the domain and range of trigonometric functions • Define the period of a periodic function, specifically of the trigonometric functions • State the period and amplitude of these basic functions • State the vertical and phase shift of the basic trigonometric functions • Solve trigonometric equations graphically • State the complete solution to a trigonometric equation • Understand that, without a set domain, an infinite amount of angles may satisfy an equation • Define the domain and range of inverse trigonometric functions • Use inverse trigonometric notation • Solve trigonometric equations algebraically • Use the sum and difference formulas • Use the co function identities • Use double angle identities • Use power reducing identities • Use half angle identities • Use product-to-sum identities • Use sum-to-product identities • Solve oblique triangles using the Law of Sines • Solve oblique triangles using the Law of Cosines • Use area formulas (specifically Heron's formula) to find the area of triangles • Graph a complex number in the complex plane • Find the absolute value of a complex number • Express a complex number in polar form • Perform polar operations • Find the components and magnitude of a vector • Perform scalar multiplication and operations of vectors • Find the dot product of two vectors and the angle between two vectors	**Projected # of days:** 34 (17 block)

Cycle 4:

Topic: Units 7-8 Analytic Geometry and Systems of Equations	**Skills:** • Define and write the equation of an ellipse • Identify important characteristics and graph ellipses • Define and write the equation of a hyperbola • Identify important characteristics and graph hyperbolas • Graph and write the equation of a translated conic • Determine the shape of a translated conic without graphing • Define and write the equation of a parabola • Identify important characteristics and graph parabolas • Locate points in a polar coordinate system • Convert between coordinates in rectangular and polar systems • Create graphs of equations in polar coordinates • Define eccentricity of an ellipse, parabola, and a hyperbola • Solve a system of equations using elimination • Solve a system of equations using substitution • Solve systems using matrices • Add, subtract, and multiply matrices by scalars • Multiply two matrices • Define the order of a matrix • Recognize consistent and inconsistent systems • Find the inverse of a matrix • Solve nonlinear systems algebraically • Find the determinant of a matrix	**Projected # of days:** 42 (21 block)