



NKHS Mathematics Curriculum

9-12

Spring 2019

North Kingstown School Department 9-12 Mathematics Curriculum

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Math Department Philosophy

The study of mathematics becomes increasingly important every year as technology becomes a presence in numerous aspects of our lives. The ability to reason logically, think critically and solve problems is the focus of all mathematics courses at North Kingstown High School. The department feels it is vital that all students have these 21st Century skills to be self-directed learners and fully capable citizens in our society.

Mission Statement

The mission of the North Kingstown High School Community is to provide our young adults a learning environment, both physically and philosophically, that fosters their growth as students, citizens and individuals through opportunity, accountability, encouragement and security.

The Math Department seeks to prepare students to reach their highest level of academic achievement in mathematics through a rigorous course sequence based on the Common Core State Standards for Mathematics as well as the Standards for Mathematical Practice. We encourage students to challenge themselves to meet all the 21st Century Learning Expectations. We focus our support for the students in areas of Problem Solving and Critical Thinking. We strive to foster a lifelong love of learning and seek to develop academic independence to the greatest extent possible for every student.

Common Core State Standards for Mathematics – High School

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NUMBERS AND QUANTITY

The Real Number System

Extend the properties of exponents to rational exponents.

CCSS.MATH.CONTENT.HSN.RN.A.1

Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.

CCSS.MATH.CONTENT.HSN.RN.A.2

Rewrite expressions involving radicals and rational exponents using the properties of exponents.

Use properties of rational and irrational numbers.

CCSS.MATH.CONTENT.HSN.RN.B.3

Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.

Quantities

Reason quantitatively and use units to solve problems.

CCSS.MATH.CONTENT.HSN.Q.A.1

Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

CCSS.MATH.CONTENT.HSN.Q.A.2

Define appropriate quantities for the purpose of descriptive modeling.

CCSS.MATH.CONTENT.HSN.Q.A.3

Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

The Complex Number System

Perform arithmetic operations with complex numbers.

CCSS.MATH.CONTENT.HSN.CN.A.1

Know there is a complex number i , such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.

CCSS.MATH.CONTENT.HSN.CN.A.2

Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

CCSS.MATH.CONTENT.HSN.CN.A.3

(+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.

Represent complex numbers and their operations on the complex plane.

CCSS.MATH.CONTENT.HSN.CN.B.4

(+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.

CCSS.MATH.CONTENT.HSN.CN.B.5

(+) Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation.

CCSS.MATH.CONTENT.HSN.CN.B.6

(+) Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.

Use complex numbers in polynomial identities and equations.

CCSS.MATH.CONTENT.HSN.CN.C.7

Solve quadratic equations with real coefficients that have complex solutions.

CCSS.MATH.CONTENT.HSN.CN.C.8

(+) Extend polynomial identities to the complex numbers.

CCSS.MATH.CONTENT.HSN.CN.C.9

(+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.

Vector and Matrix Quantities

Represent and model with vector quantities.

CCSS.MATH.CONTENT.HSN.VM.A.1

(+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., v , $|v|$, $\|v\|$, v).

CCSS.MATH.CONTENT.HSN.VM.A.2

(+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.

CCSS.MATH.CONTENT.HSN.VM.A.3

(+) Solve problems involving velocity and other quantities that can be represented by vectors.

Perform operations on vectors.

CCSS.MATH.CONTENT.HSN.VM.B.4

(+) Add and subtract vectors.

CCSS.MATH.CONTENT.HSN.VM.B.4.A

Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes.

CCSS.MATH.CONTENT.HSN.VM.B.4.B

Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum.

CCSS.MATH.CONTENT.HSN.VM.B.4.C

Understand vector subtraction $v - w$ as $v + (-w)$, where $-w$ is the additive inverse of w , with the same magnitude as w and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.

CCSS.MATH.CONTENT.HSN.VM.B.5

(+) Multiply a vector by a scalar.

CCSS.MATH.CONTENT.HSN.VM.B.5.A

Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$.

CCSS.MATH.CONTENT.HSN.VM.B.5.B

Compute the magnitude of a scalar multiple cv using $\|cv\| = |c|v$. Compute the direction of cv knowing that when $|c|v \neq 0$, the direction of cv is either along v (for $c > 0$) or against v (for $c < 0$).

Perform operations on matrices and use matrices in applications.

CCSS.MATH.CONTENT.HSN.VM.C.6

(+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.

CCSS.MATH.CONTENT.HSN.VM.C.7

(+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.

CCSS.MATH.CONTENT.HSN.VM.C.8

(+) Add, subtract, and multiply matrices of appropriate dimensions.

CCSS.MATH.CONTENT.HSN.VM.C.9

(+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.

CCSS.MATH.CONTENT.HSN.VM.C.10

(+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.

CCSS.MATH.CONTENT.HSN.VM.C.11

(+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.

CCSS.MATH.CONTENT.HSN.VM.C.12

(+) Work with 2×2 matrices as a transformations of the plane, and interpret the absolute value of the determinant in terms of area.

ALGEBRA

Interpret the structure of expressions.

CCSS.MATH.CONTENT.HSA.SSE.A.1

Interpret expressions that represent a quantity in terms of its context.

CCSS.MATH.CONTENT.HSA.SSE.A.1.A

Interpret parts of an expression, such as terms, factors, and coefficients.

CCSS.MATH.CONTENT.HSA.SSE.A.1.B

Interpret complicated expressions by viewing one or more of their parts as a single entity.

CCSS.MATH.CONTENT.HSA.SSE.A.2

Use the structure of an expression to identify ways to rewrite it.

Write expressions in equivalent forms to solve problems.

CCSS.MATH.CONTENT.HSA.SSE.B.3

Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

CCSS.MATH.CONTENT.HSA.SSE.B.3.A

Factor a quadratic expression to reveal the zeros of the function it defines.

CCSS.MATH.CONTENT.HSA.SSE.B.3.B

Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

CCSS.MATH.CONTENT.HSA.SSE.B.3.C

Use the properties of exponents to transform expressions for exponential functions.

CCSS.MATH.CONTENT.HSA.SSE.B.4

Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems.

Arithmetic with Polynomials and Rational Expressions

Perform arithmetic operations on polynomials.

CCSS.MATH.CONTENT.HSA.APR.A.1

Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

Understand the relationship between zeros and factors of polynomials.

CCSS.MATH.CONTENT.HSA.APR.B.2

Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a , the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.

CCSS.MATH.CONTENT.HSA.APR.B.3

Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

Use polynomial identities to solve problems.

CCSS.MATH.CONTENT.HSA.APR.C.4

Prove polynomial identities and use them to describe numerical relationships.

CCSS.MATH.CONTENT.HSA.APR.C.5

(+) Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n , where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.

Rewrite rational expressions.

CCSS.MATH.CONTENT.HSA.APR.D.6

Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.

CCSS.MATH.CONTENT.HSA.APR.D.7

(+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.

Creating Equations

Create equations that describe numbers or relationships.

CCSS.MATH.CONTENT.HSA.CED.A.1

Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

CCSS.MATH.CONTENT.HSA.CED.A.2

Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

CCSS.MATH.CONTENT.HSA.CED.A.3

Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.

CCSS.MATH.CONTENT.HSA.CED.A.4

Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

Reasoning with Equations and Inequalities

Understand solving equations as a process of reasoning and explain the reasoning.

CCSS.MATH.CONTENT.HSA.REI.A.1

Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

CCSS.MATH.CONTENT.HSA.REI.A.2

Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

Solve equations and inequalities in one variable.

CCSS.MATH.CONTENT.HSA.REI.B.3

Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

CCSS.MATH.CONTENT.HSA.REI.B.4

Solve quadratic equations in one variable.

CCSS.MATH.CONTENT.HSA.REI.B.4.A

Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.

CCSS.MATH.CONTENT.HSA.REI.B.4.B

Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b .

Solve systems of equations.

CCSS.MATH.CONTENT.HSA.REI.C.5

Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.

CCSS.MATH.CONTENT.HSA.REI.C.6

Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

CCSS.MATH.CONTENT.HSA.REI.C.7

Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$.

CCSS.MATH.CONTENT.HSA.REI.C.8

(+) Represent a system of linear equations as a single matrix equation in a vector variable.

CCSS.MATH.CONTENT.HSA.REI.C.9

(+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3×3 or greater).

Represent and solve equations and inequalities graphically.

CCSS.MATH.CONTENT.HSA.REI.D.10

Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

CCSS.MATH.CONTENT.HSA.REI.D.11

Explain why the x -coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

CCSS.MATH.CONTENT.HSA.REI.D.12

Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

FUNCTIONS

Understand the concept of a function and use function notation.

CCSS.MATH.CONTENT.HSF.IF.A.1

Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.

CCSS.MATH.CONTENT.HSF.IF.A.2

Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

CCSS.MATH.CONTENT.HSF.IF.A.3

Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.

Interpret functions that arise in applications in terms of the context.

CCSS.MATH.CONTENT.HSF.IF.B.4

For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

CCSS.MATH.CONTENT.HSF.IF.B.5

Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.

CCSS.MATH.CONTENT.HSF.IF.B.6

Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

Analyze functions using different representations.

CCSS.MATH.CONTENT.HSF.IF.C.7

Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

CCSS.MATH.CONTENT.HSF.IF.C.7.A

Graph linear and quadratic functions and show intercepts, maxima, and minima.

CCSS.MATH.CONTENT.HSF.IF.C.7.B

Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

CCSS.MATH.CONTENT.HSF.IF.C.7.C

Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.

CCSS.MATH.CONTENT.HSF.IF.C.7.D

(+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.

CCSS.MATH.CONTENT.HSF.IF.C.7.E

Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

CCSS.MATH.CONTENT.HSF.IF.C.8

Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

CCSS.MATH.CONTENT.HSF.IF.C.8.A

Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.

CCSS.MATH.CONTENT.HSF.IF.C.8.B

Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)12^t$, $y = (1.2)^{\frac{t}{10}}$, and classify them as representing exponential growth or decay.

CCSS.MATH.CONTENT.HSF.IF.C.9

Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

Building Functions

Build a function that models a relationship between two quantities.

CCSS.MATH.CONTENT.HSF.BF.A.1

Write a function that describes a relationship between two quantities.

CCSS.MATH.CONTENT.HSF.BF.A.1.A

Determine an explicit expression, a recursive process, or steps for calculation from a context.

CCSS.MATH.CONTENT.HSF.BF.A.1.B

Combine standard function types using arithmetic operations.

CCSS.MATH.CONTENT.HSF.BF.A.1.C

(+) Compose functions.

CCSS.MATH.CONTENT.HSF.BF.A.2

Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

Build new functions from existing functions.

CCSS.MATH.CONTENT.HSF.BF.B.3

Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

CCSS.MATH.CONTENT.HSF.BF.B.4

Find inverse functions.

CCSS.MATH.CONTENT.HSF.BF.B.4.A

Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse.

CCSS.MATH.CONTENT.HSF.BF.B.4.B

(+) Verify by composition that one function is the inverse of another.

CCSS.MATH.CONTENT.HSF.BF.B.4.C

(+) Read values of an inverse function from a graph or a table, given that the function has an inverse.

CCSS.MATH.CONTENT.HSF.BF.B.4.D

(+) Produce an invertible function from a non-invertible function by restricting the domain.

CCSS.MATH.CONTENT.HSF.BF.B.5

(+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.

Linear, Quadratic, and Exponential Models

Construct and compare linear, quadratic, and exponential models and solve problems.

CCSS.MATH.CONTENT.HSF.LE.A.1

Distinguish between situations that can be modeled with linear functions and with exponential functions.

CCSS.MATH.CONTENT.HSF.LE.A.1.A

Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.

CCSS.MATH.CONTENT.HSF.LE.A.1.B

Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.

CCSS.MATH.CONTENT.HSF.LE.A.1.C

Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

CCSS.MATH.CONTENT.HSF.LE.A.2

Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

CCSS.MATH.CONTENT.HSF.LE.A.3

Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

CCSS.MATH.CONTENT.HSF.LE.A.4

For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a , c , and d are numbers and the base b is 2, 10, or e ; evaluate the logarithm using technology.

Interpret expressions for functions in terms of the situation they model.

CCSS.MATH.CONTENT.HSF.LE.B.5

Interpret the parameters in a linear or exponential function in terms of a context.

Trigonometric Functions

Extend the domain of trigonometric functions using the unit circle.

CCSS.MATH.CONTENT.HSF.TF.A.1

Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.

CCSS.MATH.CONTENT.HSF.TF.A.2

Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.

CCSS.MATH.CONTENT.HSF.TF.A.3

(+) Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$, $\pi/4$ and $\pi/6$, and use the unit circle to express the values of sine, cosine, and tangent for x , $\pi + x$, and $2\pi - x$ in terms of their values for x , where x is any real number.

CCSS.MATH.CONTENT.HSF.TF.A.4

(+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.

Model periodic phenomena with trigonometric functions.

CCSS.MATH.CONTENT.HSF.TF.B.5

Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.

CCSS.MATH.CONTENT.HSF.TF.B.6

(+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.

CCSS.MATH.CONTENT.HSF.TF.B.7

(+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.

Prove and apply trigonometric identities.

CCSS.MATH.CONTENT.HSF.TF.C.8

Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle.

CCSS.MATH.CONTENT.HSF.TF.C.9

(+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.

GEOMETRY

Congruence

Experiment with transformations in the plane

CCSS.MATH.CONTENT.HSG.CO.A.1

Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

CCSS.MATH.CONTENT.HSG.CO.A.2

Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

CCSS.MATH.CONTENT.HSG.CO.A.3

Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

CCSS.MATH.CONTENT.HSG.CO.A.4

Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

CCSS.MATH.CONTENT.HSG.CO.A.5

Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

Understand congruence in terms of rigid motions

CCSS.MATH.CONTENT.HSG.CO.B.6

Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

CCSS.MATH.CONTENT.HSG.CO.B.7

Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.

CCSS.MATH.CONTENT.HSG.CO.B.8

Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

Prove geometric theorems

CCSS.MATH.CONTENT.HSG.CO.C.9

Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.

CCSS.MATH.CONTENT.HSG.CO.C.10

Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180° ; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.

CCSS.MATH.CONTENT.HSG.CO.C.11

Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.

Make geometric constructions

CCSS.MATH.CONTENT.HSG.CO.D.12

Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

CCSS.MATH.CONTENT.HSG.CO.D.13

Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

Similarity, Right Triangles, and Trigonometry

Understand similarity in terms of similarity transformations

CCSS.MATH.CONTENT.HSG.SRT.A.1

Verify experimentally the properties of dilations given by a center and a scale factor:

CCSS.MATH.CONTENT.HSG.SRT.A.1.A

A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.

CCSS.MATH.CONTENT.HSG.SRT.A.1.B

The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

CCSS.MATH.CONTENT.HSG.SRT.A.2

Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

CCSS.MATH.CONTENT.HSG.SRT.A.3

Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

Prove theorems involving similarity

CCSS.MATH.CONTENT.HSG.SRT.B.4

Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.

CCSS.MATH.CONTENT.HSG.SRT.B.5

Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

Define trigonometric ratios and solve problems involving right triangles

CCSS.MATH.CONTENT.HSG.SRT.C.6

Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

CCSS.MATH.CONTENT.HSG.SRT.C.7

Explain and use the relationship between the sine and cosine of complementary angles.

CCSS.MATH.CONTENT.HSG.SRT.C.8

Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

Apply trigonometry to general triangles

CCSS.MATH.CONTENT.HSG.SRT.D.9

(+) Derive the formula $A = \frac{1}{2}ab \sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.

CCSS.MATH.CONTENT.HSG.SRT.D.10

(+) Prove the Laws of Sines and Cosines and use them to solve problems.

CCSS.MATH.CONTENT.HSG.SRT.D.11

(+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).

Circles

Understand and apply theorems about circles

CCSS.MATH.CONTENT.HSG.C.A.1

Prove that all circles are similar.

CCSS.MATH.CONTENT.HSG.C.A.2

Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.

CCSS.MATH.CONTENT.HSG.C.A.3

Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

CCSS.MATH.CONTENT.HSG.C.A.4

(+) Construct a tangent line from a point outside a given circle to the circle.

Find arc lengths and areas of sectors of circles

CCSS.MATH.CONTENT.HSG.C.B.5

Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

Expressing Geometric Properties with Equations

Translate between the geometric description and the equation for a conic section

CCSS.MATH.CONTENT.HSG.GPE.A.1

Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

CCSS.MATH.CONTENT.HSG.GPE.A.2

Derive the equation of a parabola given a focus and directrix.

CCSS.MATH.CONTENT.HSG.GPE.A.3

(+) Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.

Use coordinates to prove simple geometric theorems algebraically

CCSS.MATH.CONTENT.HSG.GPE.B.4

Use coordinates to prove simple geometric theorems algebraically.

CCSS.MATH.CONTENT.HSG.GPE.B.5

Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

CCSS.MATH.CONTENT.HSG.GPE.B.6

Find the point on a directed line segment between two given points that partitions the segment in a given ratio.

CCSS.MATH.CONTENT.HSG.GPE.B.7

Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

Geometric Measurement and Dimension

Explain volume formulas and use them to solve problems

CCSS.MATH.CONTENT.HSG.GMD.A.1

Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.

CCSS.MATH.CONTENT.HSG.GMD.A.2

(+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.

Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.

CCSS.MATH.CONTENT.HSG.GMD.A.3

Visualize relationships between two-dimensional and three-dimensional objects

CCSS.MATH.CONTENT.HSG.GMD.B.4

Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

Modeling with Geometry

Apply geometric concepts in modeling situations

CCSS.MATH.CONTENT.HSG.MG.A.1

Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).

CCSS.MATH.CONTENT.HSG.MG.A.2

Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).

CCSS.MATH.CONTENT.HSG.MG.A.3

Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

STATISTICS AND PROBABILITY

Interpreting Categorical and Quantitative Data

Summarize, represent, and interpret data on a single count or measurement variable

CCSS.MATH.CONTENT.HSS.ID.A.1

Represent data with plots on the real number line (dot plots, histograms, and box plots).

CCSS.MATH.CONTENT.HSS.ID.A.2

Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

CCSS.MATH.CONTENT.HSS.ID.A.3

Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

CCSS.MATH.CONTENT.HSS.ID.A.4

Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

Summarize, represent, and interpret data on two categorical and quantitative variables

CCSS.MATH.CONTENT.HSS.ID.B.5

Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.

CCSS.MATH.CONTENT.HSS.ID.B.6

Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

CCSS.MATH.CONTENT.HSS.ID.B.6.A

Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.

CCSS.MATH.CONTENT.HSS.ID.B.6.B

Informally assess the fit of a function by plotting and analyzing residuals.

CCSS.MATH.CONTENT.HSS.ID.B.6.C

Fit a linear function for a scatter plot that suggests a linear association.

Interpret linear models

CCSS.MATH.CONTENT.HSS.ID.C.7

Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

CCSS.MATH.CONTENT.HSS.ID.C.8

Compute (using technology) and interpret the correlation coefficient of a linear fit.

CCSS.MATH.CONTENT.HSS.ID.C.9

Distinguish between correlation and causation.

Making Inferences and Justifying Conclusions

Understand and evaluate random processes underlying statistical experiments

CCSS.MATH.CONTENT.HSS.IC.A.1

Understand statistics as a process for making inferences about population parameters based on a random sample from that population.

CCSS.MATH.CONTENT.HSS.IC.A.2

Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. *For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?*

Make inferences and justify conclusions from sample surveys, experiments, and observational studies

CCSS.MATH.CONTENT.HSS.IC.B.3

Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.

CCSS.MATH.CONTENT.HSS.IC.B.4

Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.

CCSS.MATH.CONTENT.HSS.IC.B.5

Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.

CCSS.MATH.CONTENT.HSS.IC.B.6

Evaluate reports based on data.

Conditional Probability and the Rules of Probability

Understand independence and conditional probability and use them to interpret data

CCSS.MATH.CONTENT.HSS.CP.A.1

Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").

CCSS.MATH.CONTENT.HSS.CP.A.2

Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

CCSS.MATH.CONTENT.HSS.CP.A.3

Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A , and the conditional probability of B given A is the same as the probability of B .

CCSS.MATH.CONTENT.HSS.CP.A.4

Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.

CCSS.MATH.CONTENT.HSS.CP.A.5

Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.

Use the rules of probability to compute probabilities of compound events.

CCSS.MATH.CONTENT.HSS.CP.B.6

Find the conditional probability of A given B as the fraction of B 's outcomes that also belong to A , and interpret the answer in terms of the model.

CCSS.MATH.CONTENT.HSS.CP.B.7

Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model.

CCSS.MATH.CONTENT.HSS.CP.B.8

(+) Apply the general Multiplication Rule in a uniform probability model, $P(A \text{ and } B) = P(A)P(B|A) = P(B)P(A|B)$, and interpret the answer in terms of the model.

CCSS.MATH.CONTENT.HSS.CP.B.9

(+) Use permutations and combinations to compute probabilities of compound events and solve problems.

Using Probability to Make Decisions

Calculate expected values and use them to solve problems

CCSS.MATH.CONTENT.HSS.MD.A.1

(+) Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.

CCSS.MATH.CONTENT.HSS.MD.A.2

(+) Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.

CCSS.MATH.CONTENT.HSS.MD.A.3

(+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value.

CCSS.MATH.CONTENT.HSS.MD.A.4

(+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value.

Use probability to evaluate outcomes of decisions

CCSS.MATH.CONTENT.HSS.MD.B.5

(+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.

CCSS.MATH.CONTENT.HSS.MD.B.5.A

Find the expected payoff for a game of chance. *For example, find the expected winnings from a state lottery ticket or a game at a fast-food restaurant.*

CCSS.MATH.CONTENT.HSS.MD.B.5.B

Evaluate and compare strategies on the basis of expected values.

CCSS.MATH.CONTENT.HSS.MD.B.6

(+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).

CCSS.MATH.CONTENT.HSS.MD.B.7

(+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).

Standards for Mathematical Practice

<http://www.corestandards.org> © 2018 Common Core State Standards Initiative

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

AP Calculus AB and AP Calculus BC Curriculum Framework

There are no Common Core State Standards for Calculus. The CP Calculus, AP Calculus AB and AP Calculus BC courses take their standards from the College Board's AP Calculus Curriculum Framework. The Framework is composed of Enduring Understandings (EU) and Learning Objectives (LO).

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Big Idea 1: Limits

EU 1.1: The concept of a limit can be used to understand the behavior of functions.

LO 1.1A(a): Express limits symbolically using correct notation.

LO 1.1A(b): Interpret limits expressed symbolically.

LO 1.1B: Estimate limits of functions.

LO 1.1C: Determine limits of functions.

LO 1.1D: Deduce and interpret behavior of functions using limits.

EU 1.2: Continuity is a key property of functions that is defined using limits.

LO 1.1A: Analyze functions for intervals of continuity or points of discontinuity.

LO 1.2B: Determine the applicability of important calculus theorems using continuity.

Big Idea 2: Derivatives

EU 2.1: the derivative of a function is defined as the limit of a difference quotient and can be determined using a variety of strategies.

LO 2.1A: Identify the derivative of a function as the limit of a difference quotient.

LO 2.1B: Estimate derivatives.

LO 2.1C: Calculate derivatives.

LO 2.1D: Determine higher order derivatives.

EU 2.2: A function's derivative, which is itself a function, can be used to understand the behavior of the function.

LO 2.2A: Use derivatives to analyze properties of a function.

LO 2.2B: Recognize the connection between differentiability and continuity.

EU 2.3: The derivative has multiple interpretations and applications including those that involve instantaneous rates of change.

LO 2.3A: Interpret the meaning of a derivative within a problem.

LO 2.3B: Solve problems involving the slope of a tangent line.

LO 2.3C: Solve problems involving related rates, optimization, rectilinear motion, (BC) and planar motion.

LO 2.3D: Solve problems involving rates of change in applied contexts.

LO 2.3E: Verify solutions to differential equations.

LO 2.3F: Estimate solutions to differential equations.

EU 2.4: The Mean Value Theorem connects the behavior of a differentiable function over an interval to the behavior of the derivative of that function at a particular point in the interval.

LO 2.4A: Apply the Mean Value Theorem to describe the behavior of a function over an interval.

Big Idea 3: Integrals and the Fundamental Theorem of Calculus

EU 3.1: Antidifferentiation is the inverse process of differentiation.

LO 3.1A: Recognize antiderivatives of basic functions.

EU 3.2: The definite integral of a function over an interval is the limit of a Riemann sum over that interval and can be calculated using a variety of strategies.

LO 3.2A(a): Interpret the definite integral as the limit of a Riemann sum.

LO 3.2A(b): Express the limit of a Riemann sum in integral notation.

LO 3.2B: Approximate a definite integral.

LO 3.2C: Calculate a definite integral using areas and properties of definite integrals.

LO 3.2D: (BC) Evaluate an improper integral or show that an improper integral diverges.

EU 3.3: The Fundamental Theorem of Calculus, which has two distinct formulations, connects differentiation and integration.

LO 3.3A: Analyze functions defined by an integral.

LO 3.3B(a): Calculate antiderivatives.

LO 3.3B(b): Evaluate definite integrals.

EU 3.4: The definite integral of a function over an interval is a mathematical tool with many interpretations and applications involving accumulation.

LO 3.4A: Interpret the meaning of a definite integral within a problem.

LO 3.4B: Apply definite integrals to problems involving the average value of a function.

LO 3.4C: Apply definite integrals to problems involving motion.

LO 3.4D: Apply definite integrals to problems involving area, volume, (BC) and length of a curve.

LO 3.4E: Use the definite integral to solve problems in various contexts.

EU 3.5: Antidifferentiation is an underlying concept involved in solving separable differential equations. Solving separable differential equations involves determining a function or relation given its rate of change.

LO 3.5A: Analyze differential equations to obtain general and specific solutions.

LO 3.5B: Interpret, create and solve differential equations from problems in context.

Big Idea 4: Series (BC)

EU 4.1: The sum of an infinite number of real numbers may converge.

LO 4.1A: Determine whether a series converges or diverges.

LO 4.1B: Determine or estimate the sum of a series.

EU 4.2: A function can be represented by an associated power series over the interval of convergence for the power series.

LO 4.2A: Construct and use Taylor polynomials.

LO 4.2B: Write a power series representing a given function.

LO 4.2C: Determine the radius and interval of convergence of a power series.

Overarching Essential Questions

MATHEMATICS

- I. How is mathematics used to quantify and compare situations, events and phenomena?
- II. What are the mathematical attributes of objects or processes and how are they measured or calculated?
- III. How are spatial relationships, including shape and dimension, used to draw, construct, model and represent real situations or solve problems?
- IV. How is mathematics used to measure, model and calculate change?
- V. What are the patterns in the information we collect and how are they useful?
- VI. How can mathematics be used to provide models that help us interpret data and make predictions?
- VII. What are the limits of mathematical modeling/representation?
- VIII. In what ways can data be expressed so that its accurate meaning is concisely presented to a specific audience?
- IX. How do the graphs of mathematical models and data help us better understand the world in which we live?
- X. What does it mean to reason mathematically?
- XI. How can mathematics support effective communication?
- XII. What do effective problem solvers do? What do they do when they get stuck?

– adapted from Pomperaug Region #15 Schools, CT

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Instructional Strategies

Establish mathematics goals to focus learning. Effective teaching of mathematics establishes clear goals for the mathematics that students are learning, situates goals within learning progressions, and uses the goals to guide instructional decisions.

Implement tasks that promote reasoning and problem solving. Effective teaching of mathematics engages students in solving and discussing tasks that promote mathematical reasoning and problem solving and allow multiple entry points and varied solution strategies.

Use and connect mathematical representations. Effective teaching of mathematics engages students in making connections among mathematical representations to deepen understanding of mathematical concepts and procedures and as tools for problem solving.

Facilitate meaningful mathematical discourse. Effective teaching of mathematics facilitates discourse among students to build shared understanding of mathematical ideas by analyzing and comparing student approaches and arguments.

Pose purposeful questions. Effective teaching of mathematics uses purposeful questions to assess and advance students' reasoning and sense making about important mathematical ideas and relationships.

Build procedural fluency from conceptual understanding. Effective teaching of mathematics builds fluency with procedures on a foundation of conceptual understanding so that students, over time, become skillful in using procedures flexibly as they solve contextual and mathematical problems.

Support productive struggle in learning mathematics. Effective teaching of mathematics consistently provides students, individually and collectively, with opportunities and supports to engage in productive struggle as they grapple with mathematical ideas and relationships.

Elicit and use evidence of student thinking. Effective teaching of mathematics uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning.

"Mathematics Teaching Practices", *Principles to Actions, Ensuring Mathematical Success for All*, National Council of Teachers of Mathematics, Reston, VA, 2014.

Scope and Sequence

Algebra 1

Unit 1: Solving Linear Equations	Student will be able to:	Assessments	CCSS
Lesson 1: Solving Equations Lesson 2: Solving Equations with Fractions and Decimals Lesson 3: Word Problems with Equations Lesson 4: Literal Equations Lesson 5: Solving Proportions	<ul style="list-style-type: none"> Solve equations including those with fractions and decimals Model real word applications with equations and use them to solve problems Solve linear formulas to highlight a quantity of interest Use proportions to solve problems while identifying appropriate units of measure 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-SSE.1, A-SSE.3, A-CED.1, A-CED.3, A-CED.4, A-REI.1, A-REI.3
Unit 2: Functions	Student will be able to:	Assessments	CCSS
Lesson 1: Unit Rates (conversions) Lesson 2: Percentages (percent increase and decrease) Lesson 3: Relations and Functions	<ul style="list-style-type: none"> Calculate percent of increase and percent of decrease Determine whether a relation is a function by using mapping diagrams, the vertical line test etc. Write in function notation Determine the domain and range of a function 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes	N-Q.1, N-Q.2, F-IF.1, F-IF.2, F-IF.4

Lesson 4: Function Notation (domain and range)		1 Common departmental test	
Unit 3: Graphing Linear Equations	Student will be able to:	Assessments	CCSS
Lesson 1: Graphing Lines using Tables Lesson 2: Graphing Lines from Slope-Intercept Form Lesson 3: Graphing Lines from Standard Form Lesson 4: Graphing Lines from Point-Slope Form Lesson 5: Key Parts of Graphs	<ul style="list-style-type: none"> Graph linear equations given function rules by using a table of values Graph linear equations in slope-intercept form, standard form, and point-slope form 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	F-IF.4, F-IF.7, F-BF.1, F-LE.1
Unit 4: Writing Linear Equations	Student will be able to:	Assessments	CCSS
Lesson 1: Writing Equations in Point-Slope Form Lesson 2: Writing Equations in Slope-Intercept Form	<ul style="list-style-type: none"> Write equations of lines in point-slope form, slope-intercept form, and standard form Write equations of lines from graphs Write equations of lines to model real-world situations 	Daily homework assignments In-class notes or guided note worksheets	A-REI.1, A-CED.2, F-IF.4, F-IF.5, F-IF.6

Lesson 3: Writing Equations in Standard Form Lesson 4: Writing Equations of Lines from Graphs Lesson 5: Writing Equations from Word Problems		2 to 3 quizzes 1 Common departmental test	
Unit 5: Linear Inequalities	Student will be able to:	Assessments	CCSS
Lesson 1: Solving Simple Inequalities Lesson 2: Solving Compound Inequalities Lesson 3: Graphing Linear Inequalities Lesson 4: Inequality Word Problems	<ul style="list-style-type: none"> • Solve one-step, multi-step, and compound inequalities • Graph linear inequalities and systems of linear inequalities 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-REI.1, A-REI.3, A-REI.5, A-REI.6

Unit 6: Absolute Value	Student will be able to:	Assessments	CCSS
Lesson 1: Solving Absolute Value Equations Lesson 2: Graphing Absolute Value Functions Lesson 3: Analyzing Graphs of Absolute Value Functions	<ul style="list-style-type: none"> • Solve absolute value equations • Graph absolute value functions • Analyze graphs of absolute value functions for increasing and decreasing intervals, domain, range, x-intercepts, y-intercepts, etc. 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-REI.1, A-FIF.4, A-FIF.5, A-FIF.6, F-IF.7
Unit 7: Systems of Equations	Student will be able to:	Assessments	CCSS
Lesson 1: Solving Systems by Graphing Lesson 2: Solving Systems by Substitution Lesson 3: Solving Systems by Elimination Lesson 4: Best Method for Solving Systems Lesson 5: Graphing Systems of Inequalities Lesson 6: Word Problems Involving Systems	<ul style="list-style-type: none"> • Solve systems of equations by graphing, substitution, and elimination • Determine the best method for solving a system of equations • Solve real-world problems involving systems of equations 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-REI.3, A-REI.5, A-REI.6, F-BF.1, F-IF.7

Unit 8: Operations on Polynomials	Student will be able to:	Assessments	CCSS
Lesson 1: Parts, Naming and Classifying Lesson 2: Adding and Subtracting Polynomials Lesson 3: Multiplying Polynomials Lesson 4: Multiplying Polynomials - Special Cases	<ul style="list-style-type: none"> • Identify terms, coefficients, and constants of polynomials • Name and classify polynomials • Add and subtract polynomials • Multiply polynomial, including special cases 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-APR.1, A-SSE.1
Unit 9: Factoring Quadratics	Student will be able to:	Assessments	CCSS
Lesson 1: Factoring Out a GCF Lesson 2: Factoring Trinomials of the type $x^2 + bx + c$ Lesson 3: Factoring Trinomials of the type $ax^2 + bx + c$ Lesson 4: Factoring Special Cases	<ul style="list-style-type: none"> • Factor quadratics by factoring out a GCF • Factor quadratics of the types $x^2 + bx + c$ and $ax^2 + bx + c$ • Factor quadratics by grouping • Factor perfect square trinomials and the difference of two squares 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-APR.1, A-SSE.1, A-SSE.3

Unit 10: Solving Quadratics	Student will be able to:	Assessments	CCSS
Lesson 1: Solving Quadratics by Factoring Lesson 2: Introduction to Square Roots Lesson 3: Solving Quadratics Using Square Roots Lesson 4: Solving Quadratics Using the Quadratic Formula	<ul style="list-style-type: none"> • Solve quadratic equations by using various methods of factoring • Simplify square roots • Solve quadratic equations by using square roots • Solve quadratic equations with the Quadratic Formula 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-APR.2, A-APR.3, A-REI.4, A-SSE.3
Unit 11: Statistics	Student will be able to:	Assessments	CCSS
Lesson 1: Mean, Median, Mode and Range Lesson 2: Dot Plots, Histograms and Frequency Tables Lesson 3: Box and Whisker Plots and Stem and Leaf Plots Lesson 4: Scatter Plots and Linear Regression	<ul style="list-style-type: none"> • Calculate mean, median, mode, and range • Analyze different visual representations of data such as dot plots, histograms, box and whisker plots, scatter plots etc. 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	S-ID.1, S-ID.2, S-ID.3, S-ID.4, S-ID.5, S-ID.6

Geometry CP

Unit 1: Geometric Foundations and Relationships	Student will be able to :	Assessments	CCSS
Lesson 1: Intro to Euclidean Geometry Lesson 2: Definitions and Naming of Geometric Figures Lesson 3: Segment and Angle Addition, Identifying Relationships Lesson 4: Parallel Lines Lesson 5: Midpoint and Distance Formulas	<ul style="list-style-type: none"> ▪ Understand the difference between description (undefined) and definition (defined) terms ▪ Know undefined terms: point, line, & plane ▪ Know precise definitions of geometric terms: angle, circle, perpendicular lines, parallel lines, line segment, congruence, segment bisector angle bisector, collinear, coplanar, skew, ray, intersection, midpoint, acute angles, obtuse angles, right angles, adjacent angles, complementary angles, & supplementary angles ▪ Use correct notation for geometric figures ▪ Write equations using segment & angle addition ▪ Calculate the midpoint & distance of a line segment and measure of an angle ▪ Analyze diagram to identify relationships of angles formed by parallel lines 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	G-CO.1, G-CO.9, G-CO.10, G-CO.12

Unit 2: Introduction to Logic and Algebraic Proof	Student will be able to:	Assessments	CCSS
Lesson 1: Conditional, Converse and Biconditional Statements Lesson 2: Truth Value, and/or, Counterexamples Lesson 3: Algebraic Properties and Reasoning Lesson 4: Triangle Angle Sum Theorem and Inequalities in Triangles	<ul style="list-style-type: none"> ▪ Translate conditional, converse, and biconditional statements ▪ Use algebraic properties to justify steps in solving problems ▪ Prove the triangle angle sum theorem 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-REI.1, G-SRT.5
Unit 3: Transformations	Student will be able to:	Assessments	CCSS
Lesson 1: Rigid Motion Transformations: Translations Lesson 2: Rigid Motion Transformations: Reflections Lesson 3: Rigid Motion Transformations: Rotations Lesson 4: Dilations Lesson 5: Multiple Transformations	<ul style="list-style-type: none"> ▪ Represent, and draw transformations after applying a variety of transformations including: translations, reflections, rotations, and dilations ▪ Describe transformations as functions ▪ Compare transformations ▪ State a sequence of transformations 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	G-CO.2, G-CO.3, G-CO.4, G-CO.5, G-SRT.1

Unit 4: Triangle Congruence	Student will be able to:	Assessments	CCSS
Lesson 1: Introduction to Congruence Lesson 2: Triangle Congruence Theorems and Postulates Lesson 3: CPCTC and Applications Lesson 4: Isosceles Triangle Theorem Lesson 5: Midsegments and Medians	<ul style="list-style-type: none"> ▪ Compare corresponding parts of triangles to determine congruence ▪ Explain and utilize the criteria for triangle congruence <ul style="list-style-type: none"> ○ ASA, SAS, SSS, AAS, HL ▪ Use corresponding parts of congruent triangles to determine other congruent parts (CPCTC) ▪ Solve problems involving isosceles triangles, equilateral triangles, midsegments, & medians 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	G-CO.6, G-CO.7, G-CO.8, G-CO.9, G-CO.10
Unit 5: Triangle Similarity	Student will be able to:	Assessments	CCSS
Lesson 1: Ratios, Proportions and Applications Lesson 2: Similar Polygons and Applications Lesson 3: Similarity and Triangles Lesson 4: Triangle Proportionality and Side-Splitter Theorem	<ul style="list-style-type: none"> ▪ Solve Ratios & Proportions ▪ Establish AA, SSS, & SAS triangle criteria using similarity ▪ Determine if two triangles are similar by using the definition of similarity ▪ Prove theorems and solve problems involving similarity for polygons 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	G-SRT.2, G-SRT.3, G-SRT.4, G-SRT.5

Unit 6: Right Triangle Trigonometry	Student will be able to:	Assessments	CCSS
<p>Lesson 1: Simplifying Square Roots and Rationalizing Denominators</p> <p>Lesson 2: Pythagorean Theorem and Distance Formula</p> <p>Lesson 3: Special Right Triangles</p> <p>Lesson 4: Trigonometric Ratios, Trigonometric Inverses and Solving Right Triangles</p> <p>Lesson 5: Angles of Elevation and Depression</p>	<ul style="list-style-type: none"> ▪ Define Trigonometric Ratios (Sine, Cosine, & Tangent) in Right Triangles ▪ Calculate missing side lengths of Right Triangles using the Pythagorean theorem, Special Right Triangles, and trigonometric Ratios ▪ Use the Pythagorean Theorem, Special Right Triangles, & Trigonometric Ratios to Solve Right Triangles ▪ Explain and use the relationship between complementary Co-Functions ▪ Use trigonometric ratios & the Pythagorean Theorem to solve right triangles in applied problems including Angles of Elevation and Depression 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test</p>	<p>G-SRT.6, G-SRT.7, G-SRT.8, G-SRT.9, G-SRT.10, G-SRT.11</p>

Unit 7: Statistics and Probability	Student will be able to:	Assessments	CCSS
Lesson 1: Intro to Statistics, Statistical Measures and Central Tendency Lesson 2: Normal Distribution Lesson 3: Margin of Error Lesson 4: Introduction to Probability with Area Lesson 5: Conditional Probability	<ul style="list-style-type: none"> ▪ Learn statistical terminology ▪ Calculate mean, median, and mode and determine which measure of central tendency is most appropriate given a situation ▪ Solve problems with normal distribution & standard deviation ▪ Analyze a margin of error ▪ Determine probabilities within a given area ▪ Solve problems using conditional probability 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	S-ID.2, S-IS.3, S-ID.4, S-CP.1, S-CP.2, S-CP.3, S-CP.4, S-CP.5
Unit 8: Circle Relationships and Algebraic Representations	Student will be able to:	Assessments	CCSS
Lesson 1: Circles: Terms Lesson 2: Tangents and Chords Lesson 3: Arc Length and Sector Area Lesson 4: Converting between Degrees and Radians Lesson 5: Equations of Circles	<ul style="list-style-type: none"> ▪ Identify and describe relationships among inscribed angles, radii, chords, central angles, and tangents ▪ Prove all circles are similar ▪ Define radians and relate to degrees ▪ Write the equation of a circle in standard form using the process of completing the square 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	G-C.1, G-C.2, G-C.5

Unit 9: 2-Dimensional Area	Student will be able to:	Assessments	CCSS
Lesson 1: Circles: Circumference, Arc Length, Area and Sector Area Lesson 2: Area and Perimeter of Quadrilaterals and Triangles Lesson 3: Parallelograms and Trapezoids - with Special Right Triangles and Pythagorean Theorem Lesson 4: Area and Perimeter of Regular Polygons - with Trigonometry Lesson 5: Area and Perimeter of Similar Figures	<ul style="list-style-type: none"> ▪ Calculate the area and perimeter of: circles, triangles, quadrilaterals, & regular polygons ▪ Calculate a missing value working backwards in area or perimeter problems ▪ Use similarity ratios to compare figures or calculate a missing value 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	7.G.4, 7.G.6
Unit 10: Surface Area and Volume of 3-Dimensional Geometric Solids	Student will be able to:	Assessments	CCSS
Lesson 1: Naming Polyhedra, Cross-sections and Rotations Lesson 2: Surface Area of Cubes, Rectangular Prisms and Cylinders Lesson 3: Volume of Cylinders and Prisms Lesson 4: Volume of Cones and Pyramids	<ul style="list-style-type: none"> ▪ Name Geometric Solids based on their properties ▪ Identify the resulting 2-D Geometric Shapes created by Cross Sections of 3-D Geometric Solids ▪ Identify Three-Dimensional Objects Generated by Two-Dimensional Rotations ▪ Calculate the Surface Area and Volume of Cylinders, Prisms, Cubes, Pyramids, Cones, Spheres, and 3-D Composite Figures ▪ Use Similarity Ratios to compare figures or calculate a missing value 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes	G-MG.1, G-MG.2, G-MG.3, G-GMD.1, G-GMD.2, G-GMD.3, G-SRT.5

Lesson 5: Volume of Spheres and Composites Lesson 6: Density and Design Problems		1 Common departmental test	

Geometry Honors

Unit 1: Solving Linear Equations	Student will be able to :	Assessments	CCSS
<p>Lesson 1: Points, Lines and Planes Lesson 2: Distance, Length and Midpoint Lesson 3: Angle Relationships Lesson 4: Parallel Lines and Transversals</p>	<ul style="list-style-type: none"> ▪ Understand the difference between description (undefined) and definition (defined) terms ▪ Know undefined terms: point, line, & plane ▪ Know precise definitions of geometric terms: angle, circle, perpendicular lines, parallel lines, line segment, congruence, segment bisector angle bisector, collinear, coplanar, skew, ray, intersection, midpoint, acute angles, obtuse angles, right angles, adjacent angles, complementary angles, & supplementary angles ▪ Use correct notation for geometric figures ▪ Write equations using segment & angle addition ▪ Calculate the midpoint & distance of a line segment and measure of an angle ▪ Analyze diagram to identify relationships of angles formed by parallel lines 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test</p>	<p>G-CO.1, G-CO.9, G-CO.10, G-CO.12</p>

Unit 2: Introduction to Logic and Algebraic Proof	Student will be able to:	Assessments	CCSS
Lesson 1: Intro to Logic Lesson 2: Algebraic Proofs Lesson 3: Proofs with Segments Lesson 4: Proofs with Angles	<ul style="list-style-type: none"> ▪ Translate conditional, converse, and biconditional statements ▪ Complete proofs using theorems, postulates, definitions, and algebraic properties ▪ Complete proofs with parallel lines ▪ Prove the triangle angle sum theorem 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-REI.1, G-SRT.5
Unit 3: Transformations	Student will be able to:	Assessments	CCSS
Lesson 1: Reflections Lesson 2: Translations Lesson 3: Rotations Lesson 4: Dilations	<ul style="list-style-type: none"> ▪ Represent, and draw transformations after applying a variety of transformations including: translations, reflections, rotations, and dilations ▪ Describe transformations as functions ▪ Compare transformations ▪ State a sequence of transformations 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	G-CO.2, G-CO.3, G-CO.4, G-CO.5, G-SRT.1

Unit 4: Triangle Congruence	Student will be able to:	Assessments	CCSS
<p>Lesson 1: Angles of Triangles</p> <p>Lesson 2: Congruent Triangles</p> <p>Lesson 3: Proving Congruence</p> <p>Lesson 4: Isosceles Triangles</p> <p>Lesson 5: Bisectors, Medians and Altitudes</p>	<ul style="list-style-type: none"> ▪ Compare corresponding parts of triangles to determine congruency. ▪ Explain and utilize the criteria for triangle congruence: ASA, SAS, SSS, AAS, HL, CPCTC ▪ Prove theorems about triangles using the triangle congruence criteria. 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test</p>	<p>G-CO.6, G-CO.7, G-CO.8, G-CO.9, G-CO.10</p>

Unit 5: Triangle Similarity	Student will be able to:	Assessments	CCSS
Lesson 1: Proportions and Similarity Lesson 2: Similar Polygons and Similar Triangles Lesson 3: Parallel Lines and Proportional Parts Lesson 4: Parts of Similar Triangles	<ul style="list-style-type: none"> ▪ Establish AA, SSS, SAS triangle criteria using similarity transformations ▪ Determine if two triangles are similar by using the definition of similarity ▪ Prove theorems and solve problems involving similarity using congruence and similarity triangles using the triangle congruence criteria 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	G-SRT.2, G-SRT.3, G-SRT.4, G-SRT.5
Unit 6: Right Triangle Trigonometry	Student will be able to:	Assessments	CCSS
Lesson 1: Geometric Mean and Pythagorean Theorem Lesson 2: Special Right Triangles Lesson 3: Trigonometry Lesson 4: Angles of Elevation and Depression	<ul style="list-style-type: none"> ▪ Find the geometric mean between two numbers ▪ Solve problems involving relationships between parts of a right triangle and the altitude to the hypotenuse ▪ Use the Pythagorean Theorem and its converse ▪ Use properties of 45-45-90 and 30-60-90 triangles ▪ Find trigonometric ratios using right triangles ▪ Solve problems using trigonometric ratios ▪ Solve problems using angles of elevation and depression 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	G-SRT.6, G-SRT.7, G-SRT.8, G-SRT.9, G-SRT.10, G-SRT.11

Unit 7: Polygons	Student will be able to:	Assessments	CCSS
Lesson 1: Angles and Properties of Polygons Lesson 2: Properties and Tests for Parallelograms Lesson 3: Quadrilaterals Lesson 4: Coordinate Proofs	<ul style="list-style-type: none"> ▪ Prove theorems about parallelograms ▪ Use coordinates to prove simple geometric theorems ▪ Use coordinates to compute perimeter and area using Pythagorean Theorem and distance formula ▪ Describe the rotations and reflections that carry polygons onto themselves ▪ Find the sum of the measures of the interior and exterior angles of a polygon ▪ Recognize and apply properties of the sides, angles and diagonals of parallelograms ▪ Recognize the conditions that ensure a quadrilateral is a parallelogram ▪ Prove that a set of points forms a parallelogram in the coordinate plane ▪ Recognize and apply properties of rectangles, rhombi, squares and trapezoids ▪ Determine whether parallelograms are rectangles ▪ Solve problems involving the medians of trapezoids ▪ Position and label quadrilaterals for use in coordinate proofs ▪ Prove theorems using coordinate proof 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	G-GPE.4, G-GPE.5, G-GPE.6, G-GPE.7, G-MG.1

Unit 8: Circles	Student will be able to:	Assessments	CCSS
Lesson 1: Circles and Circumference Lesson 2: Angles and Arcs Lesson 3: Arcs and Chords Lesson 4: Inscribed Angles Lesson 5: Tangents Lesson 6: Tangents, Secants and Angle Measures Lesson 7: Special Segments in a Circle Lesson 8: Equations of a Circle	<ul style="list-style-type: none"> ▪ Identify and describe relationships among inscribed angles, radii, chords, central angles, and tangents. ▪ Prove all circles are similar ▪ Calculate arc length and area of sectors ▪ Use radians as a form of measure ▪ Write the equation of a circle in standard form. 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	G-C.1, G-C.2, G-C.5

Unit 9: 2-D and 3-D Measurements and Modeling	Student will be able to:	Assessments	CCSS
Lesson 1: Area of Figures Lesson 2: Area of Regular Polygons Lesson 3: Geometry Probability Lesson 4: Volumes of Prisms and Cylinders Lesson 5: Volumes of Pyramids and Cones Lesson 6: Volume of Spheres Lesson 7: Congruent and Similar Solids	<ul style="list-style-type: none"> ▪ Calculate area of triangles, quadrilaterals, regular polygons and circles ▪ Describe objects using geometric shapes ▪ Calculate volumes of cylinders, pyramids, cones, and prisms ▪ Solve design problems using volume 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	G-MG.1, G-MG.2, G-MG.3, G-GMD.1, G-GMD.2, G-GMD.3, G-SRT.5

Problem Solving

Unit 1: Solving Equations	Student will be able to:	Assessments	CCSS
Lesson 1: Solving 2-Step Equations Lesson 2: Solving Multi-Step Equations Lesson 3: Word Problems with Equations Lesson 4: Literal Equations Lesson 5: Clearing Fractions and Decimals	<ul style="list-style-type: none"> • Solve two–step equations • Solve multi-step equations • Solve a literal equation for a specific variable, and use formulas to solve problems. • Clear fractions and decimals • Solve word problems 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-SSE.1, A-SSE.3, A-CED.1, A-CED.3, A-CED.4, A-REI.1, A-REI.3
Unit 2: Operations with Polynomials	Student will be able to:	Assessments	CCSS
Lesson 1: Simplify Algebraic Expressions Lesson 2: Evaluating Polynomial Expressions Lesson 3: Simplify Polynomial Expressions Lesson 4: Multiplying Binomials and Trinomials	<ul style="list-style-type: none"> • Apply the appropriate arithmetic operations and algebraic properties needed to simplify an algebraic expression. • Evaluate a polynomial expression for specified values. • Simplify polynomial expressions using addition and subtraction. • Multiply a monomial and polynomial. • Multiply two binomials or trinomials 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-APR.1, A-SSE.1

Unit 3: Graphing Linear Equations	Student will be able to:	Assessments	CCSS
Lesson 1: Slope of a Line Lesson 2: Graphing Lines from Slope-Intercept Form Lesson 3: Graphing Lines from Standard Form Lesson 4: Graphing Lines from Point-Slope Form Lesson 5: Modeling	<ul style="list-style-type: none"> • Identify and calculate the slope of a line • Graph linear equations using a variety of methods • Determine the equation of a line. • Graph and interpret real-world situations using linear models 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	F-IF.4, F-IF.7, F-BF.1, F-LE.1
Unit 4: Systems of Equations	Student will be able to:	Assessments	CCSS
Lesson 1: Solving Systems by Graphing Lesson 2: Solving Systems by Substitution Lesson 3: Solving Systems by Elimination Lesson 4: Word Problems Involving Systems	<ul style="list-style-type: none"> • Solve systems of equations using the graphing method • Solve systems of equations using the substitution method • Solve systems of equations using the elimination method • Solve systems of equations using the multiplication method • Solve systems of equations given a word problem 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-REI.3, A-REI.5, A-REI.6, F-BF.1, F-IF.7

Unit 5: Inequalities	Student will be able to:	Assessments	CCSS
Lesson 1: Solving Inequalities - Addition and Subtraction Lesson 2: Solving Inequalities - Multiplication and Division Lesson 3: Solving Multi-Step Inequalities Lesson 4: Compound Inequalities Lesson 5: Linear Inequalities Lesson 6: Systems of Inequalities	<ul style="list-style-type: none"> • Solve inequalities using addition and subtraction • Solve inequalities using multiplication and division • Solve multi-step inequalities • Write and solve compound inequalities • Solve linear inequalities • Solve systems of inequalities 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-REI.1, A-REI.3, A-REI.5, A-REI.6
Unit 6: Right Triangle Trigonometry	Student will be able to:	Assessments	CCSS
Lesson 1: Simplifying Radicals Lesson 2: Solving Triangles with Pythagorean Theorem Lesson 3: Special Right Triangles Lesson 4: Solving Triangles with Trigonometry Lesson 5: Angles of Elevation and Depression	<ul style="list-style-type: none"> • Simplify radical expressions • Solve triangles using the Pythagorean theorem • Special right triangles • Solve right triangles using Trigonometry • Angle of Elevation and Angle of Depression 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	G-SRT.6, G-SRT.7, G-SRT.8, G-SRT.9, G-SRT.10, G-SRT.11

Unit 7: Statistics and Probability	Student will be able to:	Assessments	CCSS
Lesson 1: Intro to Statistics, Statistical Measures and Central Tendency Lesson 2: Normal Distribution Lesson 3: Margin of Error Lesson 4: Introduction to Probability with Area Lesson 5: Conditional Probability	<ul style="list-style-type: none"> ▪ Learn statistical terminology ▪ Calculate mean, median, and mode and determine which measure of central tendency is most appropriate given a situation ▪ Solve problems with normal distribution & standard deviation ▪ Analyze a margin of error ▪ Determine probabilities within a given area ▪ Solve problems using conditional probability 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	S-ID.2, S-IS.3, S-ID.4, S-CP.1, S-CP.2, S-CP.3, S-CP.4, S-CP.5
Unit 8: Polynomials	Student will be able to:	Assessments	CCSS
Lesson 1: Factor Using GCF Lesson 2: Factoring Trinomials of the type $ax^2 + bx + c$ Lesson 3: Solving Quadratic Equations Lesson 4: Completing the Square Lesson 5: Features of a Parabola Lesson 6: Graphing Parabolas	<ul style="list-style-type: none"> • Identify the greatest common factor of the terms of a polynomial expression • Express a polynomial as a product of a monomial and a polynomial • Find all factors of the quadratic expression $ax^2 + bx + c$ by factoring • Solve quadratic equations • Solve quadratics by completing the square • Identify the vertex and direction of opening of a parabola from the equation in standard and vertex form. • Graphing a parabola in vertex and standard form 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-APR.2, A-APR.3, A-REI.4, A-SSE.3

Unit 9: Circles	Student will be able to:	Assessments	CCSS
Lesson 1: Parts of a Circle Lesson 2: Arc Measure and Arc Length Lesson 3: Area of a Sector Lesson 4: Degrees and Radians Lesson 5: Equations of Circles	<ul style="list-style-type: none"> • Identify parts of a circle, including: arc measure and arc length, central angles, inscribed angles • Identify tangents and chords and determine their measures • Determine an arc length and the area of a sector • Convert degrees to radians and radians to degrees • Write and graph equations of circles 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	G-C.1, G-C.2, G-C.5
Unit 10: Area and Volume	Student will be able to:	Assessments	CCSS
Lesson 1: Area of 2-Dimensional Figures Lesson 2: Area of Regular Polygon Lesson 3: Volume of 3-Dimensional Solids Lesson 4: Word Problems Lesson 5: Area and Volume of Composite Figures	<ul style="list-style-type: none"> • Calculate the area of a triangle, parallelogram, trapezoid, square, rectangle, and circle • Calculate the area of a regular polygon • Calculate the volume of various prisms and pyramids, cone, cylinder, and sphere • Solve word problems involving the surface area and volume of polygons and solids. • Find the area and volume of composite solids 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	7.G.4, 7.G.6 G-MG.1, G-MG.2, G-MG.3, G-GMD.1, G-GMD.2, G-GMD.3, G-SRT.5

Algebra 2 CP

Unit 1: Linear Programming	Student will be able to:	Assessments	CCSS
Lesson 1: Graphing Systems of Equations Lesson 2: Graphing Systems of Inequalities and Writing Systems of Inequalities Lesson 3: Intro to Linear Programming Lesson 4: Linear Programming Word Problems	<ul style="list-style-type: none"> • Interpret a verbal model to define variables and write an objective function. • Represent constraints as equations or inequalities • Graph systems of equations, with clear labeling and scales, to determine a feasible region • Identify important quantities in a practical situation and map their relationship • Interpret the corner points to find optimal solution • Identify and interpret solutions as viable or non-viable options in a real-world context 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-CED.2, A-CED.3, A-REI.6, N-Q.2, F-LE.5
Unit 2: Families of Functions	Student will be able to:	Assessments	CCSS
Lesson 1: Functions and their Properties Lesson 2: Domain, Range, End Behavior; Intervals of Increase and Decrease	<ul style="list-style-type: none"> • Graph and identify key features of parent functions • Identify and perform transformations • Analyze functions by determining: graph, domain, end behavior, minimums, 	Daily homework assignments In-class notes or guided note worksheets	F-BF.2, F-BF.3, F-BF.4, F-IF.3, F-IF.4, F-IF.5, F-IF.7, F-IF.9

Lesson 3: Graphing Parent Functions Lesson 4: Graphing Transformations of a Parent Function	maximums, symmetries, intervals behavior	2 to 3 quizzes 1 Common departmental test	
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Unit 3: Solving Quadratic Equations	Student will be able to:	Assessments	CCSS
Lesson 1: Complex Numbers Lesson 2: Solving Quadratic Equations by Factoring Lesson 3: Solving Quadratic Equations with Square Roots Lesson 4: Solving Quadratic Equations by Completing the Square Lesson 5: Solving Quadratic Equations with the Quadratic Formula	<ul style="list-style-type: none"> • Add, subtract, multiply, and divide with complex numbers • Solve quadratic equations with one variable using factoring, completing the square and quadratic formula • Solve quadratic equations with complex solutions 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	N-CN.1, N-CN.2, N-CN.7, A-REI.4, A-CED.1, F-BF.3, F-IF.4, F-IF.6
Unit 4: Graphing Quadratic Functions	Student will be able to:	Assessments	CCSS
Lesson 1: Properties of Parabolas and Quadratic Regression Lesson 2: Graphing Quadratics in Standard Form	<ul style="list-style-type: none"> • Write an equation in vertex form given a graph of an equation in standard form • Compare two quadratic functions, each represented in a different way • Fit a function to data (regression). 	Daily homework assignments	N-CN.1, N-CN.2, N-CN.7, A-REI.4, A-CED.1, F-BF.3, F-IF.4, F-IF.6

<p>Lesson 3: Graphing Quadratics in Vertex Form Lesson 4: Converting between Forms; Writing Equations from Graphs Lesson 5: Projectile Motion Word Problems</p>		<p>In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test</p>	
<p>Unit 5: Polynomial Functions: Operations</p>	<p>Student will be able to:</p>	<p>Assessments</p>	<p>CCSS</p>
<p>Lesson 1: Factoring Sum and Difference of Cubes Lesson 2: Factoring Polynomials Lesson 3: Classifying, Adding and Subtracting Polynomials Lesson 4: Multiplying Polynomials Lesson 5: Long Division and Synthetic Division of Polynomials Lesson 6: The Remainder Theorem and The Factor Theorem</p>	<ul style="list-style-type: none"> ● Perform arithmetic operations on polynomial expressions, Factor sum/difference of cubes ● Perform division of Polynomials Long and Synthetic ● Use the Remainder and Factor Theorem 	<p>Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test</p>	<p>A-CED.1, A-SSE.2, A-APR.2, A-APR.3, A-APR.4, A-REI.11, F-BF.1, F-IF.4, F-IF.7</p>

Unit 6: Analyzing Polynomial Functions	Student will be able to:	Assessments	CCSS
Lesson 1: Solving Polynomial Equations Lesson 2: Writing Functions Given Zeros Lesson 3: Key Part of Polynomial Graphs Lesson 4: Analyzing Polynomial Graphs Lesson 5: Graphing Polynomials	<ul style="list-style-type: none"> Find Roots and zeros of Polynomial Functions/Graphs Classify Polynomials and interpret key features of graphs and tables, including relative maximum and minimum 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-CED.1, A-SSE.2, A-APR.2, A-APR.3, A-APR.4, A-REI.11, F-BF.1, F-IF.4, F-IF.7
Unit 7: Exponential and Logarithmic Functions, Equations and Graphs	Student will be able to:	Assessments	CCSS
Lesson 1: Exponential Growth and Decay Word Problems Lesson 2: Writing Exponential Equations Given Two Points Lesson 3: Exponential and Logarithmic Form Lesson 4: Evaluating Logarithmic Expressions Lesson 5: Properties of Logarithms Lesson 6: Solving Exponential and Logarithmic Equations	<ul style="list-style-type: none"> Graph and analyze the transformations of logarithmic functions and exponential functions Graph and analyze the parent functions of the natural log and base e Solve Exponential and logarithmic functions Apply properties of logarithms to solve equations and simplify expressions Simplify expression using change of base formula 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-CED.1, F-BF.4, F-IF.4, F-IF.7, F-IF.8, F-LE.4, F-LE.5, A-SSE.3, A-SSE.4, S-ID.6

Lesson 7: Analyzing Graphs of Exponential and Logarithmic Functions Lesson 8: Graphing Exponential and Logarithmic Functions	<ul style="list-style-type: none"> Use calculator to evaluate expressions and solve equations in the form of e, \ln, and \log 		
Unit 8: Rational Functions	Student will be able to:	Assessments	CCSS
Lesson 1: Simplifying Rational Functions Lesson 2: Multiplying and Dividing Rational Functions Lesson 3: Adding and Subtracting Rational Functions Lesson 4: Complex Fractions Lesson 5: Solving Rational Equations Lesson 6: Graphing Rational Functions	<ul style="list-style-type: none"> Rewrite rational expression in different forms Solve rational equations Graph and analyze rational functions Identify points of discontinuity and vertical asymptotes 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-APR.6, F-BF.1, F-BF.3, A-CED.1, F-IF.4, F-IF.9, A-REI.2, A-REI.11
Unit 9: Radical Functions, Equations and Expressions	Student will be able to:	Assessments	CCSS
Lesson 1: Simplifying Radical Functions Lesson 2: Multiplying and Dividing Radical Functions Lesson 3: Rational Exponents Lesson 4: Solving Radical Equations	<ul style="list-style-type: none"> Analyze and use the properties of rational exponents Solve radical equations Graph and analyze radical functions 	Daily homework assignments In-class notes or guided note worksheets	F-BF.1, F-BF.3, F-IF.4, F-IF.9, A-REI.2, N-RN.1, N-RN.2

Lesson 5: Graphing Radical Functions		2 to 3 quizzes 1 Common departmental test	
Unit 10: Trigonometry - The Unit Circle	Student will be able to:	Assessments	CCSS
Lesson 1: Degrees, Radians and Arc Length Lesson 2: Angles in the Coordinate Plane Lesson 3: The Unit Circle: Sine and Cosine Functions Lesson 4: The Unit Circle: Tangent Function	<ul style="list-style-type: none"> • Draw an angle in standard position. • Find and use coterminal angles • Find trigonometric function values given: <ol style="list-style-type: none"> 1. a point 2. a trig function and a quadrant. • Use reference angles • Evaluate exact trigonometric function values • Graph and analyze sine and cosine functions • Write Sinusoidal functions given a graph • Perform sinusoidal regressions • Solve word problems 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	F-TF.1, F-TF.2, F-TF.8, F-BF.3, F-TF.5

Algebra 2 Honors

Unit 1: Linear Programming	Student will be able to:	Assessments	CCSS
<p>Lesson 1: Solving Systems of Equations</p> <p>Lesson 2: Solving Systems of Inequalities</p> <p>Lesson 3: Linear Programming</p> <p>Lesson 4: Linear Programming: Applications</p>	<ul style="list-style-type: none"> • Interpret a verbal model to define variables and write an objective function • Represent constraints as equations or inequalities • Graph systems of equations, with clear labeling and scales, to determine a feasible region • Identify important quantities in a practical situation and map their relationship • Interpret the corner points to find optimal solution • Identify and interpret solutions as viable or non-viable options in a real-world context 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test</p>	<p>A-CED.2, A-CED.3, A-REI.6, N-Q.2, F-LE.5</p>

Unit 2: Solving Quadratics; Complex Numbers	Student will be able to:	Assessments	CCSS
Lesson 1: Complex Numbers Lesson 2: Solving Quadratics Lesson 3: Quadratic Graphs: Standard Form Lesson 4: Quadratic Graphs: Vertex Form Lesson 5: Quadratic Inequalities Lesson 6: Writing Quadratic Equations	<ul style="list-style-type: none"> • Add, subtract, multiply, and divide with complex numbers • Solve quadratic equations with one variable using factoring, completing the square and quadratic formula • Solve quadratic equations with complex solutions. • Write an equation in vertex form given a graph of an equation in standard form • Compare two quadratic functions, each represented in a different way • Fit a function to data (regression) 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	N-CN.1, N-CN.2, N-CN.7, A-REI.4, A-CED.1, F-BF.3, F-IF.4
Unit 3: Parent Functions/Analyzing Graphs	Student will be able to:	Assessments	CCSS
Lesson 1: Functions Lesson 2: Analyzing Key Features Lesson 3: Parent Functions Lesson 4: Transformations Lesson 5: Inverses of Simple Quadratic, Radical and Rational Functions	<ul style="list-style-type: none"> • Graph and identify key features of parent functions • Explore transformations • Analyze functions by determining: graph, domain and range, end behavior, minima, maxima, symmetry, intervals of behavior, roots and zeros • Find inverses of simple quadratic, radical, and rational functions. 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	F-BF.2, F-BF.3, F-BF.4, F-IF.3, F-IF.4, F-IF.5, F-IF.7, F-IF.9

Unit 4: Polynomial Functions	Student will be able to:	Assessments	CCSS
Lesson 1: Arithmetic Operations on Polynomial Functions: Factor Sum/Difference of Cubes Lesson 2: Division of Polynomials; Long and Synthetic Lesson 3: The Remainder and Factor Theorems Lesson 4: Roots and Zeros Lesson 5: Classify Polynomials; Key Features	<ul style="list-style-type: none"> • Perform arithmetic operations on polynomial expressions, Factor sum/difference of cubes • Perform division of Polynomials Long and Synthetic • Use the Remainder and Factor Theorem • Find Roots and zeros of Polynomial Functions/Graphs • Classify Polynomials and interpret key features of graphs and tables, including relative maximum and minimum 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-CED.1, A-SSE.2, A-APR.2, A-APR.3, A-APR.4, A-REI.11, F-BF.1, F-IF.4, F-IF.7
Unit 5: Rational Functions	Student will be able to:	Assessments	CCSS
Lesson 1: Rational Expression: Simplifying and Operations Lesson 2: Adding and Subtracting Rational Expressions Lesson 3: Solving Rational Equations Lesson 4: Graphing Rational Functions: Points of Discontinuity and Asymptote	<ul style="list-style-type: none"> • Rewrite rational expression in different forms • Solve rational equations • Graph and analyze rational functions • Identify points of discontinuity and vertical asymptotes 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-APR.6, F-BF.1, F-BF.3, A-CED.1, F-IF.4, F-IF.9, A-REI.2, A-REI.11

Unit 6: Radical Functions	Student will be able to:		CCSS
Lesson 1: Properties of Rational Exponents and Radicals Lesson 2: Solving Radical Equations Lesson 3: Graphing and Analyzing Radical Functions Lesson 4: Graphing and Modeling	<ul style="list-style-type: none"> • Analyze and use the properties of rational exponents • Solve radical equations • Graph and analyze radical functions 		F-BF.1, F-BF.3, F-IF.4, F-IF.9, A-REI.2, N-RN.1, N-RN.2
Unit 7: Exponential and Logarithmic Functions	Student will be able to:	Assessments	CCSS
Lesson 1: Solving Exponential Equations Lesson 2: Solving Logarithmic Equations Lesson 3: Properties of Logarithms Lesson 4: Common Logarithms Lesson 5: Base e and Natural Logarithms Lesson 6: Graphing Exponential and Logarithmic Functions	<ul style="list-style-type: none"> • Graph and analyze the transformations of logarithmic functions and exponential functions • Graph and analyze the parent functions of the natural log and base e • Solve Exponential and logarithmic functions • Apply properties of logarithms to solve equations and simplify expressions • Simplify expression using change of base formula • Use calculator to evaluate expressions and solve equations in the form of e, \ln, \log 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-CED.1, F-BF.4, F-IF.4, F-IF.7, F-IF.8, F-LE.4, F-LE.5, A-SSE.3, A-SSE.4, S-ID.6

Unit 8: Trigonometry: The Unit Circle and Identities	Student will be able to:	Assessments	CCSS
Lesson 1: Radians and Angle Measures Lesson 2: Trigonometric Functions; Reference Angles Lesson 3: The Unit Circle Lesson 4: Trigonometric Identities	<ul style="list-style-type: none"> • Draw an angle in standard position • Find and use coterminal angles • Find trigonometric function values given: <ol style="list-style-type: none"> 1. a point 2. a trig function and a quadrant • Use reference angles • Evaluate exact trigonometric function values • Simplify trigonometric expressions • Solve word problem 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	F-TF.1, F-TF.2, F-TF.8
Unit 9: Graphing Sine and Cosine Functions	Student will be able to:	Assessments	CCSS
Lesson 1: Sine and Cosine Graphs Lesson 2: Graphing Sine and Cosine with Amplitude, Midline and Phase Shift Transformations Lesson 3: Graphing Sine and Cosine with Period Change Lesson 4: Writing Functions from a Graph Lesson 5: Data and Word Problems	<ul style="list-style-type: none"> • Graph and Analyze Sine and Cosine Functions • Write Sinusoidal functions given a graph • Perform sinusoidal regressions • Solve word problems 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	F-BF.3, F-TF.5

Unit 10: Probability and Statistics	Student will be able to:	Assessments	CCSS
<p>Lesson 1: Intro to Statistics, Normal Distribution, Margin of Error, and Measures of Central Tendency</p> <p>Lesson 2: Conditional Probability and Sample Space</p> <p>Lesson 3: Addition Probability</p> <p>Lesson 4: Counting Principle</p>	<ul style="list-style-type: none"> ● Determine if a sample is random ● Analyze a margin of error ● Calculate mean, median, and mode and determine which measure of central tendency is most appropriate given a situation ● Solve problems with normal distribution and standard deviation ● Solve problems using Conditional and Addition probability ● Apply the counting principle 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test</p>	<p>S-CP.1, S-CP.2, S-CP.3, S-CP.4, S-CP.5, S-CP.6, S-CP.7</p>

College and Career Math

Unit 1: Arithmetic	Student will be able to:	Assessments	CCSS
Lesson 1: Basic Operations with Integers Lesson 2: Basic Operations with Decimals Lesson 3: Basic Operations with Fractions Lesson 4: Basic Operations with Word Problems Lesson 5: Measurement	<ul style="list-style-type: none"> Perform the basic operations of addition, subtraction, multiplication and division on integers, decimals, fractions Apply basic operations to word problems Use metric and standard units of measurement 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	5.1 - 7 NBT 5.1,5.2 NF 5.1 MD
Unit 2: Numeracy	Student will be able to:	Assessments	CCSS
Lesson 1: Reasonableness of Solutions Lesson 2: Interpreting Data Representations Lesson 3: Using Estimating to Solve Problems Lesson 4 Vocabulary and Notations Lesson 5: Magnitude of Numbers	<ul style="list-style-type: none"> Evaluate the reasonableness of an answer to an applied problem Read and interpret graphs, charts and tables Estimate solutions to solve problems Order sets of numbers according to magnitude with decimals, integers, fractions and signed numbers 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	8.SP 8.1SP 8.NS

Unit 3: Statistics and Probability	Student will be able to:	Assessments	CCSS
Lesson 1: Evaluate and Interpret Probability of Events Lesson 2: Interpret Measures of Central Tendency Lesson 3: Construct and Interpret Data Representations Lesson 4: Calculate Probabilities Using Data Sets. Lesson 5: Counting Principle	<ul style="list-style-type: none"> ● Evaluate and interpret the probability of a simple events ● Find and interpret measures of central tendency ● Construct various data representations such as box and whiskers, stem and leaf, histograms and circle graphs ● Calculate simple probabilities ● Apply the counting principle to solve problems ● Use Venn diagrams and other manipulatives to calculate probabilities 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	S-ID.1, S-ID.2, S-ID.3, S-CP.1, S-CP.2, S-CP.6, S-CP.7
Unit 4: Algebra	Student will be able to:	Assessments	CCSS
Lesson 1: One, Two and Multistep Equations Lesson 2: Evaluate Polynomial Expressions Lesson 3: Write and Graph Linear Equations Lesson 4: Analyze Scatter Plots and Find Regression Lines Lesson 5: Writing Algebraic Expressions.	<ul style="list-style-type: none"> ● Solve linear equations ● Evaluate polynomial expressions ● Write and graph linear equations ● Analyze scatter plots finding the line of best fit ● Express word problems in algebraic notation 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-CED.1, A-CED.2 A-REI.1

Unit 5: Area and Volume	Student will be able to:	Assessments	CCSS
Lesson 1: Areas of Polygons Lesson 2: Surface Area of Prisms/ Cylinders Lesson 3: Surface Area of Pyramids and Cones Lesson 4: Nets	<ul style="list-style-type: none"> ● Identify basic geometric shapes ● Calculate areas of basic geometric shapes ● Calculate surface area and volume of basic 3 dimensional figures ● Use nets to calculate surface area 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	7.G.6, G-MG.1

CP Statistics

Unit 1: Describing Data I	Student will be able to:	Assessments	CCSS
<p>Lesson 1: Categorical vs Numerical Data</p> <p>Lesson 2: Describing/Representing Categorical Data</p> <p>Lesson 3: Describing/Representing Numerical Data</p>	<ul style="list-style-type: none"> • Identify different types of variables • Create and interpret frequency tables, pie charts, bar charts, dot plots, histograms, stem and leaf plots, and back to back stem and leaf plots 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test</p>	<p>S-ID.1, S-ID.2, S-ID.3, S-ID.4, S-ID.5, S-ID.6, S-ID.7, S-ID.8, S-ID.9</p>

Unit 2: Describing Data II	Student will be able to:	Assessments	CCSS
Lesson 1: Measures of Center with and without Frequency Lesson 2: Variance and Standard Deviation with and without Frequency Lesson 3: Box Plots and IQR	<ul style="list-style-type: none"> • Calculate the mean, median, and mode of data that is presented in a variety of ways • Calculate mean, median, and mode of data from frequency tables and group frequency tables • Calculate variance and standard deviation from sets of data • Calculate standard deviation and variance from frequency tables and group frequency tables • Create a box plot from a data set • Create and interpret a five number summary from a data set • Students will be introduced to z-scores and normalizing data 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	S-ID.1, S-ID.2, S-ID.3, S-ID.4, S-ID.5, S-ID.6, S-ID.7, S-ID.8, S-ID.9
Unit 3: Probability and Counting Principles	Student will be able to:	Assessments	CCSS
Lesson 1: Sample Spaces, Probability Lesson 2: Addition Rules Lesson 3: Multiplication Rules Lesson 4: Counting Rules Lesson 5: Probability	<ul style="list-style-type: none"> • Create and interpret sample spaces • Calculate probabilities of simple events occurring • Use addition rules to calculate probabilities • Use multiplication rules to calculate probabilities 	Daily homework assignments In-class notes or guided note worksheets	S-CP.1, S-CP.2, S-CP.3, S-CP.4, S-CP.5, S-CP.6, S-CP.7, S-CP.8, S-CP.9

	<ul style="list-style-type: none"> • Identify when to use combinations or permutations • Calculate permutations and combinations • Calculate probabilities involving permutations and combinations 	<p>2 to 3 quizzes</p> <p>1 Common departmental test</p>	
Unit 4: Distributions	Student will be able to:	Assessments	CCSS
<p>Lesson 1: Binomial Distributions</p> <p>Lesson 2: Geometric Distributions</p> <p>Lesson 3: Normal Distribution</p> <p>Lesson 4: Central Limit Theorem</p> <p>Lesson 5: Confidence Intervals with Proportions</p>	<ul style="list-style-type: none"> • Identify, calculate, and interpret binomial distributions • Identify, calculate, and interpret geometric distributions • Identify, calculate, and interpret normal distributions • Apply and interpret the CLT • Apply and interpret confidence intervals when using proportions 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test</p>	<p>S-CP.1, S-CP.2, S-CP.3, S-CP.4, S-CP.5, S-CP.6, S-CP.7, S-CP.8, S-CP.9</p>

Unit 5: Hypothesis Testing	Student will be able to:	Assessments	CCSS
Lesson 1: Confidence Intervals with Means Lesson 2: Hypothesis Testing with Proportions Lesson 3: Hypothesis Testing with Means Lesson 4: Linear Regression	<ul style="list-style-type: none"> • Apply and interpret confidence intervals using means • Apply and interpret Hypothesis testing with proportions • Apply and interpret hypothesis testing with means 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	S-MD.1, S-MD.2, S-MD.3, S-MD.4, S-MD.5, S-MD.6, S-MD.7

PreCalculus CP

Unit 1: Analysis of Functions	Student will be able to:	Assessments	CCSS
Lesson 1: Functions Lesson 2: Graphs of Functions Lesson 3: Properties of Functions Lesson 4: Linear Functions and Models Lesson 5: Library of Functions Lesson 6: Graphing Transformations Lesson 7: Composite Functions	<ul style="list-style-type: none"> • Define and determine when a relation is a function • Identify functions from their graphs • Identify and perform basic transformations on the library of functions • Compose functions 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	F-BF.2, F-BF.3, F-BF.4, F-IF.3, F-IF.4, F-IF.5, F-IF.7, F-IF.9

Unit 2: Exponential and Logarithmic Functions	Student will be able to:	Assessments	CCSS
<p>Lesson 1: One-to-One and Inverse Functions</p> <p>Lesson 2: Exponential Functions</p> <p>Lesson 3: Logarithmic Functions</p> <p>Lesson 5: Properties of Logarithms</p> <p>Lesson 6: Logarithmic and Exponential Equations</p> <p>Lesson 7: Compound Interest</p> <p>Lesson : Exponential Growth and Decay</p>	<ul style="list-style-type: none"> ● Identify one-to-one functions and inverse functions graphically and from tabular data ● Graph exponential functions with basic transformations ● Graph logarithmic functions with basic transformations ● Convert between exponential and logarithmic expressions ● Use the properties of logarithms to expand and condense logarithmic expressions ● Solve exponential and logarithmic equations, with and without a calculator ● Solve problems involving compound interest and exponential growth and decay in real world applications 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test</p>	<p>A-CED.1, F-BF.4, F-IF.4, F-IF.7, F-IF.8, F-LE.4, F-LE.5, A-SSE.3, A-SSE.4, S-ID.6</p>

Unit 3: Polynomial and Rational Functions	Student will be able to:	Assessments	CCSS
Lesson 1: Polynomial Functions and Models Lesson 4: Real Zeros of a Polynomial Function Lesson 5: Complex Zeros: Fundamental Theorem of Algebra Lesson 2: Properties of Rational Functions Lesson 3: Graphs of Rational Functions	<ul style="list-style-type: none"> • Identify key features of polynomial functions • Find real and complex zeros of a polynomial function • Use the Remainder and Factor Theorem. • Graph polynomial functions • Identify key features of rational functions. • Graph rational functions • Find a polynomial given the zeros of the function 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-CED.1, A-SSE.1, A-SSE.2, A-APR.2, A-APR.3, A-APR.4, A-REI.11, F-BF.1, F-IF.4
Unit 4: Introduction to Trigonometric Functions	Student will be able to:	Assessments	CCSS
Lesson 1: Angles and their Measures Lesson 2: Trigonometric Functions: A Unit Circle Approach Lesson 3: Properties of Trigonometric Functions	Convert between radians and degrees Find exact values of trigonometric functions using unit circle, right triangles, identities, other trigonometric functions Determine the signs of a trigonometric function given a quadrant Draw angles on the unit circle. Establish identities	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	F-TF.1, F-TF.2, F-TF.3

Unit 5: Analytic Trigonometry	Student will be able to:	Assessments	CCSS
Lesson 1: The Inverse Sine, Cosine and Tangent Functions Lesson 2: Trigonometric Equations Lesson 3: Trigonometric Equations: Quadratics Lesson 4: Algebraic Techniques and Trigonometric Identities.	<ul style="list-style-type: none"> Identify and use the restricted domain properties of inverse trigonometric functions Solve trigonometric equations, including those in quadratic form Recognize and use reciprocal and rational identities when establishing identities Apply Pythagorean identities when establishing identities 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	F-TF.1, F-TF.2, F-TF.3, F-TF.5, F-TF.6 F-TF.8, F-TF.9, F-BF.4
Unit 5: Graphing Trigonometric Functions	Student will be able to:	Assessments	CCSS
Lesson 1: Graphs of Sine and Cosine Lesson 2: Graphs of Tangent, Cotangent, Secant and Cosecant Lesson 3: Phase Shift; Sinusoidal Curve Fitting	<ul style="list-style-type: none"> Identify and graph sine, cosine and tangent functions including transformations on amplitude, period, displacement and phase shift Fit sinusoidal curves to periodic data 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	F-TF.1, F-TF.2, F-TF.5, F-TF.8, F-BF.3

PreCalculus Honors

Unit 1: Families of Functions from a Calculus Perspective	Student will be able to:	Assessments	CCSS
<p>Lesson 1: Transforming Functions</p> <p>Lesson 2: Analyzing Graphs of Functions and Relations</p> <p>Lesson 3: Inverse Relations and Functions</p> <p>Lesson 4: Function Operations and Composition</p>	<ul style="list-style-type: none"> • Visualize the anatomy of a transformation of the 12 basic parent functions without a calculator • Graph the 12 basic parent functions without a calculator • Review the key characteristics of the 12 basic functions: domain, range, asymptotes, restrictions, holes, intercepts, extrema, increasing & decreasing behavior • Analyze the 12 basic functions by analyzing 4 more characteristics: symmetry, continuity, end behavior, and boundedness • Show evidence both graphically and algebraically that two functions are inverses 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test</p>	<p>F-BF.2, F-BF.3, F-BF.4, F-IF.3, F-IF.4, F-IF.5, F-IF.7, F-IF.9</p>

Unit 2: Power, Polynomial and Functions of Higher Degree	Student will be able to:	Assessments	CCSS
<p>Lesson 1: Power and Radical Functions</p> <p>Lesson 2: Polynomial Functions of Higher Degree</p> <p>Lesson 3: Remainder and Factor Theorems</p> <p>Lesson 4: Real Zeros of Polynomials</p> <p>Lesson 5: Complex Zeros and the Fundamental Theorem</p> <p>Lesson 6: Solving Rational Equations in one Variable</p> <p>Lesson 7: Solving Inequalities Using Sign Charts</p> <p>Lesson 8: Modeling with Non-linear Regression</p>	<ul style="list-style-type: none"> • Sketch power functions in the form of $f(x)$ • Predict what the graphs of power functions will look like when quadrants are specified • Graph polynomial functions, predict their end behavior, and find their real zeros using a grapher or an algebraic method • Divide polynomials using long division or synthetic division; to apply the Remainder Theorem, Factor Theorem, and Rational Zeros Theorem; and find upper and lower bounds for zeros of polynomials • Factor polynomials with real coefficients using factors with complex coefficients • Solve equations involving fractions using both algebraic and graphical techniques and identify extraneous solutions • Solve inequalities involving polynomials and rational functions by using both algebraic and graphical techniques 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test</p>	<p>A-CED.1, A-SSE.1, A-SSE.2, A-APR.2, A-APR.3, A-APR.4, A-APR.7, A-REI.11, F-BF.1, F-IF.4</p>

Unit 3: Exponential, Logarithmic and Logistic Functions	Student will be able to:	Assessments	CCSS
<p>Lesson 1: Modeling with Exponential and Logistic Functions</p> <p>Lesson 2: Logarithmic Functions and their Graphs</p> <p>Lesson 3: Properties of Logarithmic Functions</p> <p>Lesson 4: Modeling with Logarithmic Functions</p>	<ul style="list-style-type: none"> • Evaluate exponential expressions and identify and graph exponential and logistic functions • Use exponential growth, decay, and regression to model real-life problems • Convert equations between logarithmic form and exponential form, evaluate common and natural logarithms, and graph common and natural logarithmic functions • Apply the properties of logarithms to evaluate expressions and graph functions, and be able to re-express data • Apply the properties of logarithms to solve exponential and logarithmic equations algebraically and solve application problems using these equations • Use exponential functions and equations to solve business and finance applications related to compound interest and annuities 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test</p>	<p>A-CED.1, F-BF.4, F-IF.4, F-IF.7, F-IF.8, F-LE.4, F-LE.5, A-SSE.3, A-SSE.4, S-ID.6, F-BF.5</p>

Unit 4: Discrete Math	Student will be able to:	Assessments	CCSS
<p>Lesson 1: Sequences, Series and Sums Lesson 2: Basic Combinatorics Lesson 3: Probability Lesson 4: Binomial Theorem Lesson 5: Graphical Statistics and Data Lesson 6: Algebraic Statistics and Data</p>	<ul style="list-style-type: none"> • Identify the common difference in arithmetic sequences and find a general term and specific terms of that sequence • Identify the common ratio in geometric sequences and find a general term and specific terms of that sequence • Solve problems involving dependent and independent events • Use the Counting Principle appropriately. • Recognize and apply when to use combinations or permutations • Find the probability of dependent or independent events including compound events • Apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n • Represent data with plots on the real number line • Use statistics appropriate to the shape of the data distribution to compare center and spread • Use a data set to fit to a normal distribution and estimate areas under the normal curve 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test</p>	<p>A-APR.4, A-APR.5, S-MD.1, S-CP.2, S-CP.3, S-CP.5, S-ID.1, S-ID.2, S-ID.3, S-ID.4</p>

Unit 5: Trigonometric Functions	Student will be able to:	Assessments	CCSS
<p>Lesson 1: Review of Right Triangle Trigonometry and the Unit Circle</p> <p>Lesson 2: Graphing other Trigonometric Functions (Tan, Cot, Sec, Csc)</p> <p>Lesson 3: Graphs of Composite Trigonometric Functions</p> <p>Lesson 4: Inverse Trigonometric Functions</p>	<ul style="list-style-type: none"> • Generate the graphs of all 6 Trig Functions • Describe how they can be transformed • Analyze all 8 parts of any transformed Trig Function • Use their graphs to solve Trig Equations • Understand the importance of finding the one-to-one portion of both sine and cosine functions • Generate the graphs of the “Fundamental Cycle” of the inverse trigonometric functions: arcsine, arccosine, arctangent, and describe how they can be transformed • Evaluate inverse trigonometric functions without a calculator • Calculate a viewing angle using inverse trigonometric ratios • Identify sinusoids as well as periodicity algebraically • Graph sums and differences of sinusoids, and other combinations of trigonometric, algebraic and inverse trigonometric functions • Recognize and graph damped oscillation without a calculator 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test</p>	<p>F-TF.1, F-TF.2, F-TF.3, F-TF.4, F-TF.6, F-TF.7, F-BF.3</p>

Unit 6: Analytic Trigonometry	Student will be able to:	Assessments	CCSS
Lesson 1: Fundamental Identities Lesson 2: Verifying Trigonometric Identities Lesson 3: Solving Trigonometric Equations Lesson 4: Using Sum and Difference Identities Lesson 5: Using Multiple Angle Identities Lesson 5: Law of Sines and Law of Cosines	<ul style="list-style-type: none"> • Confirm identities analytically • Apply the identities for the cosine, sine, and tangent of a difference or sum • Apply the double-angle identities, power reducing identities, and the half-angle identities in order to evaluate trig functions and solve trig equations • Understand the Law of Sines and use it to solve a variety of problems • Apply the Law of Cosines to solve acute and obtuse triangles and to determine the area of a triangle in terms of the measures of the sides and the angles 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	F-TF.1, F-TF.2, F-TF.3, F-TF.5, F-TF.6 F-TF.8, F-TF.9, F-BF.4
Unit 7: An Introduction to Calculus	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
Lesson 1: Limits: Rate of Change and Tangent Lines Lesson 2: Limits: A Numerical and Graphical Approach Lesson 3: Basic Limit Laws and Rules Lesson 4: Limits and Continuity Lesson 5: Evaluating Limits Algebraically Lesson 6: Trigonometric Limits Lesson 7: Limits at Infinity	<ul style="list-style-type: none"> • Compute average velocity over given time intervals • Estimate the instantaneous rate of change at a given point • Calculate the average rate of change of a given function (graphically presented) over a given time interval and draw and label the corresponding secant line • Recognize a graphical display of a tangent line to a function, estimate the slope of it, and be able to describe what it represents 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes	EU 1.1: The concept of a limit can be used to understand the behavior of a function. EU 1.2: Continuity is a key property of functions that is defined using limits.

	<ul style="list-style-type: none">• Recognize the correct limit notation for both one-sided and two-sided limits• Evaluate both one-sided and two-sided limits numerically, using the basic limit laws as well as both the constant and identity rules• Recognize when a limit does not exist or when it is increasing or decreasing in an unbounded manner from one side given the function• Use a graph to estimate the value of both one-sided and two sided limits• Evaluate limits using algebra only	1 Common departmental test	
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Unit 8: Matrices	Student will be able to:	Assessments	CCSS
Lesson 1: Matrix Operations, Determinants and Inverses Lesson 2: 3X3 Matrix Inverses Lesson 3: Matrix Applications	<ul style="list-style-type: none"> • Find sums, differences, and products of any order matrices • Find determinants and inverses of 2 by 2 and 3 by 3 matrices • Create appropriate rectangular arrays of real world data in order to solve problems • Interpret how double subscripts “encode” the matrix elements and “decipher” the given codes to determine the entries of the matrices • Use the calculator to set up augmented matrices in order to solve real world problems involving systems of equations • Use Cramer’s Rule and the calculator to solve real world problems involving systems of equations • Use the calculator to set up matrices in order to solve for area of a triangle 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	A-REI.8, A-REI.9

CP Calculus

Unit 1: Foundations for Calculus	Student will be able to:	Assessments	CCSS
Lesson 1: Lines Lesson 2: Functions and Graphs Lesson 3: Exponential Functions Lesson 4: Inverse Functions and Logarithms Lesson 5: Trigonometric Functions	<ul style="list-style-type: none"> ● Use increments to calculate slopes ● Write an equation and sketch a graph of a line ● Identify domain and range of a function ● Interpret and find formulas for piecewise functions ● Identify periodicity and values of trigonometric functions ● Use inverse trigonometric functions to solve problems 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	F-BF.2, F-BF.3, F-BF.4, F-IF.3, F-IF.4, F-IF.5, F-IF.7, F-IF.9, A-CED.1, F-BF.4, F-IF.4

Unit 2: Limits	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
Lesson 1: Limits Lesson 2: Limits Involving Infinity Lesson 3: Continuity Lesson 4: Rates of Change and Tangent Lines	<ul style="list-style-type: none"> • Express limits symbolically using correct notations • Interpret limits expressed symbolically • Estimate limits of functions • Determine limits of functions • Deduce and interpret behavior of functions using limits • Analyze functions for intervals of continuity or points of discontinuity • Determine the applicability of important calculus theorems using continuity 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	EU 1.1: The concept of a limit can be used to understand the behavior of a function. EU 1.2: Continuity is a key property of functions that is defined using limits.

Unit 3: Derivatives I	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
<p>Lesson 1: Definition of the Derivative; Tangent and Normal Lines</p> <p>Lesson 2: Differentiability</p> <p>Lesson 3: Derivative Rules</p> <p>Lesson 4: Derivatives of Trigonometric Functions</p>	<ul style="list-style-type: none"> • Calculate slopes and derivatives using the definition of the derivative • Graph f from the graph of f', graph f' from the graph of f, and graph the derivative of a function given numerically with data • Find where a function is not differentiable and distinguish between corners, cusps, discontinuities, and vertical tangents • Approximate derivatives numerically and graphically • Use the rules of differentiation to calculate derivatives, including second and higher order derivatives • Use n-derive calculator function to find numerical derivatives • Use the rules for differentiating the six basic trigonometric functions 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test</p>	<p>EU 2.1: The derivative of a function is defined as the limit of a difference quotient and can be determined using a variety of strategies.</p> <p>EU 2.2: A function's derivative, which is itself a function, can be used to understand the behavior of the function.</p>

Unit 4: Derivatives II	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
Lesson 1: Velocity and other Rates of Change Lesson 2: The Chain Rule	<ul style="list-style-type: none"> • Use derivatives to analyze straight line motion and solve other problems involving rates of change • Differentiate composite functions using the chain rule • Find slopes of parameterized curves 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	EU 2.1: The derivative of a function is defined as the limit of a difference quotient and can be determined using a variety of strategies. EU 2.2: A function's derivative, which is itself a function, can be used to understand the behavior of the function. EU 2.3: The derivative has multiple interpretations and applications including those that involve instantaneous rates of change.
Unit 5: Derivatives III	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
Lesson 1: Implicit Differentiation Lesson 2: Derivatives of Exponentials and Logarithms	<ul style="list-style-type: none"> • Find derivatives using implicit differentiation • Find derivatives using the power rule for rational powers of x • Calculate derivatives of exponential and logarithmic functions 	Daily homework assignments In-class notes or guided note worksheets	EU 2.1: The derivative of a function is defined as the limit of a difference quotient and can be determined using a variety of strategies.

		<p>2 to 3 quizzes</p> <p>1 Common departmental test</p>	<p>EU 2.2: A function's derivative, which is itself a function, can be used to understand the behavior of the function.</p> <p>EU 2.3: The derivative has multiple interpretations and applications including those that involve instantaneous rates of change.</p>
Unit 6: Foundations for Applications of the Derivative	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
<p>Lesson 1: Extreme Values</p> <p>Lesson 2: Mean Value Theorem</p>	<ul style="list-style-type: none"> • Determine local or global extreme values of a function • Apply the mean value theorem • Find the intervals on which a function is increasing or decreasing 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test</p>	<p>EU 2.2: A function's derivative, which is itself a function, can be used to understand the behavior of the function.</p> <p>EU 2.3: The derivative has multiple interpretations and applications including those that involve instantaneous rates of change.</p> <p>EU 2.4: The Mean Value Theorem connects the behavior of a differentiable function over an interval to the behavior of the</p>

			derivative of that function at a particular point in the interval.
Unit 7: Applications of the Derivative	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
Lesson 1: Connecting f' and f'' with the Graph of f . Lesson 2: Modeling and Optimization Lesson 3: Related Rates	<ul style="list-style-type: none"> • Use the first and second derivative tests to determine the local extreme values of a function • Determine the concavity of a function and locate the points of inflection by analyzing the second derivative • Graph f using information about f' • Solve application problems involving finding minimum or maximum values of functions • Solve related rate problems 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	EU 2.2: A function's derivative, which is itself a function, can be used to understand the behavior of the function. EU 2.3: The derivative has multiple interpretations and applications including those that involve instantaneous rates of change.
Unit 8: Geometric Approximations of Area Under a Curve	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
Lesson 1: Estimating with Finite Sums Lesson 2: Definite Integrals	<ul style="list-style-type: none"> • Approximate the area under the graph of a nonnegative continuous function by using the Rectangular Approximation Methods (RAM) • Interpret the area under a graph as a net accumulation of a rate of change 	Daily homework assignments	EU 3.2: The definite integral of a function over an interval is the limit of a Riemann sum over that interval and can be

	<ul style="list-style-type: none"> Express the area under a curve as a definite integral and as a limit of Riemann sums Compute the area under a curve using a numerical integration procedure 	<p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test</p>	<p>calculated using a variety of strategies.</p>
Unit 9: Definite Integrals and the Fundamental Theorem	Students will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
<p>Lesson 1: Definite Integrals and Antiderivatives</p> <p>Lesson 2: Fundamental Theorem of Calculus</p>	<ul style="list-style-type: none"> Apply rules for definite integrals and find the average value of a function over a closed interval Apply the fundamental theorem of calculus Understand the relationship between the derivative and definite integral as expressed in both parts of the Fundamental Theorem of Calculus 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test</p>	<p>EU 3.1: Anti-differentiation is the inverse process of differentiation.</p> <p>EU 3.2: The definite integral of a function over an interval is the limit of a Riemann sum over that interval and can be calculated using a variety of strategies.</p> <p>EU 3.3: The Fundamental Theorem of Calculus, which has two distinct formulations, connects differentiation and integration.</p>

AP Statistics

Unit 1: Exploring and Understanding Data	Student will be able to:	Assessments	CCSS
Lesson 1: Stats Starts Here Lesson 2: Data Lesson 3: Displaying & Describing Categorical Data Lesson 4: Displaying Quantitative Data Lesson 5: Describing Distributions Numerically Lesson 6: The Standard Deviation as a Rule and the Normal Model	<ul style="list-style-type: none"> ● Identify the cases and variables in any data set ● Classify a variable as categorical or quantitative and choose an appropriate display for it ● Identify the units in which the variable has been measured ● Summarize and display the distribution of a categorical variable with a frequency table, bar chart or pie chart ● Make and examine a contingency table ● Make and examine displays of the conditional distributions of one variable for two or more groups ● Describe and discuss patterns found in a contingency table and associated displays of conditional distributions ● Identify and display an appropriate display for the distribution of any quantitative variable ● Describe the distribution of a quantitative variable in terms of its shape, center and spread ● Describe any anomalies or extraordinary features revealed by the display of a variable ● Compare the distributions of two or more groups by comparing their shapes, centers, and spreads ● Describe patterns over time shown in a time plot ● Discuss any outliers in the data ● Explain the basic properties of the median and mean, as well as how to compute them 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.	S-ID.1, S-ID.2, S-ID.3, S-ID.4, S-ID.5, S-ID.6, S-ID.7, S-ID.8, S-ID.9,

	<ul style="list-style-type: none">• Compute the standard deviation and IQR of a set of data• Create a five-number summary of a variable• Construct a boxplot by hand from a five-number summary• Calculate the z-score of an observation• Compare values from two different distributions using their z-scores• Use Normal models and the 68-95-99.7 Rule to estimate the percentage of observations falling within one, two, or three standard deviations of the mean• Find the percentage of observations falling below any value in a Normal model using a Normal table or appropriate technology• Check whether a variable follows a Normal model by making a Normal probability plot		

Unit 2: Exploring Relationships Between Variable	Student will be able to:	Assessments	CCSS
Lesson 1: Scatterplots, Association and Correlation Lesson 2: Linear Regression Lesson 3: Regression Wisdom Lesson 4: Re-expressing Data: It's Easier Than You Think	<ul style="list-style-type: none"> ● Identify the roles of the variables and place the response variable on the y-axis and the explanatory variable on the s-axis ● Explain the conditions for correlation and how to check them ● Describe the direction, form, and scatter of a scatterplot ● Identify and describe points that deviate from the overall pattern ● Identify response (y) and explanatory (x) variables in context ● Explain how a linear equation summarizes the relationship between two variables ● Recognize when a regression should be used to summarize a linear relationship between two quantitative variables ● Judge whether the slope of a regression makes sense ● Find residuals and explain how they are related to the least squares criterion ● Use a plot of residuals against predicted values ● Find a regression equation from the summary statistics for each variable and the correlation between the variables ● Use statistics software and find the slope and intercept values in the regression output table ● Use regression to predict a value of y for a given x ● Compute and display the residual for each data value 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.	S-ID.1, S-ID.2, S-ID.3, S-ID.4, S-ID.5, S-ID.6, S-ID.7, S-ID.8, S-ID.9,

	<ul style="list-style-type: none">• Write a sentence explaining what a linear equation says about the relationship between y and x• Explain how R^2 describes how much variation in y is accounted for by its linear relationship with x• Describe a prediction made from a regression equation• Re-express data with powers and find an effective re-expression for the data using statistics software or calculator• Reverse any of the common re-expressions to put a predicted value or residual back into the original units• Describe a summary or display of a re-expressed variable making clear how it was re-expressed and giving its re-expressed units		
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Unit 3: Gathering Data	Student will be able to:	Assessments	CCSS
Lesson 1: Understanding Randomness Lesson 2: Sample Surveys Lesson 3: Experiments	<ul style="list-style-type: none"> • Recognize random outcomes and when a simulation might usefully model random behavior in a real-world situation • Perform a simulation by generating random numbers • Describe a simulation so that others could repeat it • Discuss the results of a simulation study and draw conclusions about the question being investigated • Recognize population parameters in descriptions of population • Draw a simple random sample from a master list of a population • Report possible sources of bias in samples • Recognize voluntary response and nonresponse as sources of bias in a sample survey • Explain the four basic principles of sound experiment design: control, randomize, replicate, and block • Recognize the factors, the treatments, and the response variable in a description of a designed experiment • Explain the importance of blinding and double-blinding in studies on human subjects • Design a completely randomized experiment to test the effect of a single factor • Design an experiment in which blocking is used to reduce variation 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.	S-IC.1, S-IC.2, S-IC.3, S-IC.4, S-IC.5, S-IC.6

Unit 4: Randomness & Probability	Student will be able to:	Assessments	CCSS
Lesson 1: From Randomness to Probability Lesson 2: Probability Rules! Lesson 3: Random Variables Lesson 4: Probability Models	<ul style="list-style-type: none"> • State the Law of Large Numbers. • Recognize when events are disjoint and when events are independent • Use correctly, the terms sample space, disjoint events, and independent events when making statements about probability in describing a random phenomenon • Calculate the probability of an event as the proportion of times it occurs in many repetitions of a random phenomenon • Apply the General Addition Rule and the General Multiplication Rule • Find probabilities for compound events as fractions of counts of occurrences in a two-way table • Make and use a tree diagram to understand conditional probabilities and reverse conditioning • Find the probability model for a random variable • Find the mean (expected value) and the variance of a random variable • Use the proper notation for population parameters, μ or $E(X)$ for the mean, and σ, $SD(X)$, and σ^2. • Determine the new mean and standard deviation after adding a constant, multiplying by a constant, or adding or subtracting two independent random variables • Interpret the meaning of the expected value and standard deviation of a random variable in the proper context • Recognize if a situation involves Bernoulli trials 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.	S-CP.1, S-CP.2, S-CP.3, S-CP.4, S-CP.5, S-CP.6, S-CP.7, S-CP.8, S-CP.9, S-MD.1, S-MD.2, S-MD.3, S-MD.4, S-MD.5, S-MD.6, S-MD.7

	<ul style="list-style-type: none">• Choose whether to use a Geometric or a Binomial model for a random variable involving Bernoulli trials• Identify the appropriate conditions for using a Geometric, Binomial, or Normal model• Find the expected value of a Geometric model• Calculate Geometric probabilities.• Find the mean and standard deviation of a Binomial model• Calculate Binomial probabilities, perhaps with a Normal model• Interpret means, standard deviations, and probabilities in the Bernoulli trial context		
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Unit 5: From the Data at Hand to the World at Large	Student will be able to:	Assessments	CCSS
Lesson 1: Sampling Distribution Models Lesson 2: Confidence Intervals for Proportions Lesson 3: Testing Hypotheses about Proportions Lesson 4: More About Tests Lesson 5: Comparing Two Proportions	<ul style="list-style-type: none"> • Explain that the variability of a statistic depends on the size of the sample • State that the Central Limit Theorem gives the sampling distribution model of the mean for sufficiently large samples regardless of the underlying population • Demonstrate a sampling distribution by simulation. • Use a sampling distribution model to make simple statements about the distribution of a proportion or mean under repeated sampling • Interpret a sampling distribution model • Examine data for violations of conditions that would make inference about a population proportion unwise or invalid • Construct and interpret a one-proportion z-interval • State the null and alternative hypotheses for a one-proportion z-test • Identify the conditions that must be true for a one-proportion z-test. • Identify and use the alternative hypotheses when testing hypotheses • Understand how to choose and defend between a one-sided and two-sided alternative hypothesis • Perform a one-proportion z-test • Write a sentence interpreting the results of a one-proportion z-test • Interpret the meaning of a P-value 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.	S-CP.1, S-CP.2, S-CP.3, S-CP.4, S-CP.5, S-CP.6, S-CP.7, S-CP.8, S-CP.9, S-MD.1, S-MD.2, S-MD.3, S-MD.4, S-MD.5, S-MD.6, S-MD.7

Unit 6: Learning About the World	Student will be able to:	Assessments	CCSS
Lesson 1: Inferences about Means Lesson 2: Comparing Means Lesson 3: Paired Samples and Blocks	<ul style="list-style-type: none"> • Examine data for violations of conditions that would make inference about the population mean unwise or invalid • Perform a two-tailed hypothesis test at level of significance α with a $1-\alpha$ confidence interval, or a one-tailed test with a $1-2\alpha$ confidence interval • Compute and interpret a t-test for the population mean using a statistics package or working from summary statistics for a sample • Compute and interpret a t-based confidence interval for the population mean as well • Explain the meaning of a confidence interval for a population mean • Examine data for violations of conditions that would make inference about the difference between two population means unwise or invalid • Recognize when a pooled t-test procedure might be appropriate and be able to explain why you decided to use a two-sample method • Perform a two-sample t-test using a statistics package or calculator • Perform a pooled t-test using a statistics package or calculator • Interpret a test of the null hypothesis • Recognize whether a design that compares two groups is paired or not • Find a paired confidence interval • Perform and interpret a paired t-test 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.	S-ID.1, S-ID.2, S-ID.3, S-ID.4, S-ID.5, S-ID.6, S-ID.7, S-ID.8, S-ID.9,

Unit 7: Inference When Variables are Related	Student will be able to:	Assessments	CCSS
Lesson 1: Comparing Counts Lesson 2: Inferences for Regression	<ul style="list-style-type: none"> ● Recognize when a test of goodness-of-fit, a test of homogeneity, or a test of independence would be appropriate for a table of counts ● Display and interpret counts in a two-way table ● Use the chi-square tables to perform chi-square tests ● Compute a chi-square test using statistics software or calculator ● Examine the standardized residuals to explain the nature of the deviations from the null hypothesis ● Interpret chi-square as a test of goodness-of-fit, homogeneity, or independence ● Examine your data and a scatterplot of y vs. x for violations of assumptions that would make inference for regression unwise or invalid ● Examine displays of the residuals from a regression to double-check that the conditions required for regression have been met ● Search for patterns when examining scatterplots of x against time and of the residuals against time. ● Test the standard hypothesis that the true regression slope is zero ● Find a confidence interval for the mean of the predicted y-values and a prediction interval for a particular y-value ● Interpret confidence intervals in terms of the regression ● Summarize a regression in words. 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.	S-IC.1, S-IC.2, S-IC.3, S-IC.4, S-IC.5, S-IC.6, S-MD.1, S-MD.2, S-MD.3, S-MD.4, S-MD.5, S-MD.6, S-MD.7

	<ul style="list-style-type: none">• State the meaning of the true regression slope, the standard error of the estimated slope, and the standard deviation of the errors• Interpret the P-value of the t-statistic for the slope to test the standard null hypotheses and to interpret a confidence interval for the slope• Interpret a prediction interval for a predicted y-value for given x-value and a confidence interval for the mean of y-values for a given x-value		
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AP Calculus AB

Unit 1: Limits	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
Lesson 1: Limits Lesson 2: Limits Involving Infinity Lesson 3: Continuity Lesson 4: Rates of Change and Tangent Lines	<ul style="list-style-type: none"> • Express limits symbolically using correct notations • Interpret limits expressed symbolically • Estimate limits of functions • Determine limits of functions • Deduce and interpret behavior of functions using limits • Analyze functions for intervals of continuity or points of discontinuity • Determine the applicability of important calculus theorems using continuity 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.	EU 1.1: The concept of a limit can be used to understand the behavior of a function. EU 1.2: Continuity is a key property of functions that is defined using limits.

Unit 2: Derivatives I	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
<p>Lesson 1: Definition of the Derivative; Tangent and Normal Lines</p> <p>Lesson 2: Sketching f; How f' Fails to Exist</p> <p>Lesson 3: Local Linearity; Intermediate Value Theorem</p> <p>Lesson 4: Derivative Rules</p> <p>Lesson 5: Particle Motion</p> <p>Lesson 6: Trig Derivatives</p>	<ul style="list-style-type: none"> • Identify the derivative of a function as the limit of a difference quotient • Estimate derivatives. • Calculate derivatives. • Determine higher order derivatives • Solve problems involving the slope of a tangent line • Interpret the meaning of a derivative within a problem • Solve problems involving rectilinear motion • Recognize the connection between continuity and differentiability 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.</p>	<p>EU 2.1: The derivative of a function is defined as the limit of a difference quotient and can be determined using a variety of strategies.</p> <p>EU 2.2: A function's derivative, which is itself a function, can be used to understand the behavior of the function.</p> <p>EU 2.3: The derivative has multiple interpretations and applications including those that involve instantaneous rates of change.</p>

Unit 3: Derivatives II	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
Lesson 1: The Chain Rule Lesson 2: Implicit Differentiation Lesson 3: Inverse Functions and Inverse Trig Functions Lesson 4: Exponential and Logarithmic Derivatives; Logarithmic Differentiation	<ul style="list-style-type: none"> ● Estimate derivatives ● Calculate derivatives ● Determine higher order derivatives ● Solve problems involving the slope of a tangent line ● Interpret the meaning of a derivative within a problem ● Use the Chain Rule and Implicit Differentiation to determine derivatives 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.	EU 2.1: The derivative of a function is defined as the limit of a difference quotient and can be determined using a variety of strategies. EU 2.2: A function's derivative, which is itself a function, can be used to understand the behavior of the function. EU 2.3: The derivative has multiple interpretations and applications including those that involve instantaneous rates of change.

Unit 4: Applications of the Derivative	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
Lesson 1: Extreme Values; Piecewise Functions Lesson 2: Mean Value Theorem; Increasing and Decreasing Functions Lesson 3: Derivatives Tests and Their Applications Lesson 4: Optimization Lesson 5: Differentials and Linearization Lesson 6: Related Rates Lesson 7: l'Hôpital's Rule	<ul style="list-style-type: none"> ● Use derivatives to analyze the properties of a function ● Interpret the meaning of a derivative within a problem ● Solve problems involving related rates and optimization ● Solve problems involving rates of change in applied contexts ● Apply the Mean Value Theorem to describe the behavior of a function over an interval ● Apply l'Hôpital's Rule to find derivatives of functions in indeterminate form 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.	EU 2.4: The Mean Value Theorem connects the behavior of a differentiable function over an interval to the behavior of the derivative of that function at a particular point in the interval. EU 2.3: The derivative has multiple interpretations and applications including those that involve instantaneous rates of change. EU 1.1: The concept of a limit can be used to understand the behavior of a function.

Unit 5: Integrals and The Fundamental Theorem of Calculus	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
Lesson 1: Approximating Area under the Curve Lesson 2: Riemann Sums; Definite Integrals Lesson 3: Rules for Definite Integrals and Anti-differentiation Lesson 4: The Average Value Theorem; Min-Max Inequality Lesson 5: The Fundamental Theorem of Calculus	<ul style="list-style-type: none"> • Recognize antiderivatives of basic functions • Interpret the definite integral as the limit of a Riemann sum • Express the limit of a Riemann sum as a definite integral • Approximate a definite integral • Calculate a definite integral using areas and properties of definite integrals • Analyze functions defined by an integral • Calculate antiderivatives • Evaluate definite integrals 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.	EU 3.1: Anti-differentiation is the inverse process of differentiation. EU 3.2: The definite integral of a function over an interval is the limit of a Riemann sum over that interval and can be calculated using a variety of strategies. EU 3.3: The Fundamental Theorem of Calculus, which has two distinct formulations, connects differentiation and integration.

Unit 6: Differential Equations	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
<p>Lesson 1: Differential Equations; Initial Value Problems</p> <p>Lesson 2: Slope Fields</p> <p>Lesson 3: Definite Integrals</p> <p>Lesson 4: Separation of Variables</p> <p>Lesson 5: Exponential Growth and Decay</p>	<ul style="list-style-type: none"> ● Estimate solutions to differential equations ● Verify solutions to differential equations ● Analyze functions defined by an integral ● Apply definite integrals to problem involving the average value of a function ● Analyze differential equations to obtain general and specific solutions ● Interpret, create, and solve differential equations from problems in context 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.</p>	<p>EU 3.4: The definite integral of a function over an interval is a mathematical tool with many interpretations and applications involving accumulation.</p> <p>EU 3.5: Antidifferentiation is an underlying concept involved in solving separable differential equations involves determining a function or relation given its rate of change.</p>

Unit 7: Applications of Definite Integrals	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
Lesson 1: The Definite Integral as Net Change Lesson 2: Area Between Two Curves Lesson 3: Volumes by Cross-Section and Rotation	<ul style="list-style-type: none"> • Interpret the meaning of a definite integral within a problem • Apply definite integrals to problems involving the average value of a function • Apply definite integrals to problems involving motion • Apply definite integrals to problems involving area and volume • Interpret, create, and solve differential equations from problems in context 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.	EU 3.4: The definite integral of a function over an interval is a mathematical tool with many interpretations and applications involving accumulation.

AP Calculus BC

Unit 1: Limits	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
Lesson 1: Limits Lesson 2: Limits Involving Infinity Lesson 3: Continuity Lesson 4: Rates of Change and Tangent Lines	<ul style="list-style-type: none"> • Express limits symbolically using correct notations • Interpret limits expressed symbolically • Estimate limits of functions. • Determine limits of functions • Deduce and interpret behavior of functions using limits • Analyze functions for intervals of continuity or points of discontinuity • Determine the applicability of important calculus theorems using continuity 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.	EU 1.1: The concept of a limit can be used to understand the behavior of a function. EU 1.2: Continuity is a key property of functions that is defined using limits.

Unit 2: Derivatives I	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
<p>Lesson 1: Definition of the Derivative; Tangent and Normal Lines</p> <p>Lesson 2: Sketching f'; How f' Fails to Exist</p> <p>Lesson 3: Local Linearity; Intermediate Value Theorem</p> <p>Lesson 4: Derivative Rules</p> <p>Lesson 5: Particle Motion</p> <p>Lesson 6: Trig Derivatives</p>	<ul style="list-style-type: none"> • Identify the derivative of a function as the limit of a difference quotient • Estimate derivatives • Calculate derivatives • Determine higher order derivatives • Solve problems involving the slope of a tangent line. • Interpret the meaning of a derivative within a problem • Solve problems involving rectilinear motion • Recognize the connection between continuity and differentiability 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.</p>	<p>EU 2.1: The derivative of a function is defined as the limit of a difference quotient and can be determined using a variety of strategies.</p> <p>EU 2.2: A function's derivative, which is itself a function, can be used to understand the behavior of the function.</p> <p>EU 2.3: The derivative has multiple interpretations and applications including those that involve instantaneous rates of change.</p>

Unit 3: Derivatives II	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
Lesson 1: The Chain Rule Lesson 2: Implicit Differentiation Lesson 3: Inverse Functions and Inverse Trig Functions Lesson 4: Exponential and Logarithmic Derivatives; Logarithmic Differentiation	<ul style="list-style-type: none"> • Estimate derivatives • Calculate derivatives • Determine higher order derivatives • Solve problems involving the slope of a tangent line • Interpret the meaning of a derivative within a problem • Use the Chain Rule and Implicit Differentiation to determine derivatives 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.	EU 2.1: The derivative of a function is defined as the limit of a difference quotient and can be determined using a variety of strategies. EU 2.2: A function's derivative, which is itself a function, can be used to understand the behavior of the function. EU 2.3: The derivative has multiple interpretations and applications including those that involve instantaneous rates of change.

Unit 4: Applications of the Derivative	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
<p>Lesson 1: Extreme Values; Piecewise Functions</p> <p>Lesson 2: Mean Value Theorem; Increasing and Decreasing Functions</p> <p>Lesson 3: Derivatives Tests and Their Applications</p> <p>Lesson 4: Optimization</p> <p>Lesson 5: Differentials and Linearization</p> <p>Lesson 6: Related Rates</p>	<ul style="list-style-type: none"> • Use derivatives to analyze the properties of a function • Interpret the meaning of a derivative within a problem • Solve problems involving related rates and optimization. • Solve problems involving rates of change in applied contexts • Apply the Mean Value Theorem to describe the behavior of a function over an interval 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.</p>	<p>EU 2.4: The Mean Value Theorem connects the behavior of a differentiable function over an interval to the behavior of the derivative of that function at a particular point in the interval.</p> <p>EU 2.3: The derivative has multiple interpretations and applications including those that involve instantaneous rates of change.</p> <p>EU 1.1: The concept of a limit can be used to understand the behavior of a function.</p>

Unit 5: Integrals and The Fundamental Theorem of Calculus	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
<p>Lesson 1: Approximating Area under the Curve</p> <p>Lesson 2: Riemann Sums; Definite Integrals</p> <p>Lesson 3: Rules for Definite Integrals and Anti-differentiation</p> <p>Lesson 4: The Average Value Theorem; Min-Max Inequality</p> <p>Lesson 5: The Fundamental Theorem of Calculus</p>	<ul style="list-style-type: none"> • Recognize antiderivatives of basic functions • Interpret the definite integral as the limit of a Riemann sum • Express the limit of a Riemann sum as a definite integral • Approximate a definite integral • Calculate a definite integral using areas and properties of definite integrals • Analyze functions defined by an integral • Calculate antiderivatives • Evaluate definite integrals 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.</p>	<p>EU 3.1: Anti-differentiation is the inverse process of differentiation.</p> <p>EU 3.2: The definite integral of a function over an interval is the limit of a Riemann sum over that interval and can be calculated using a variety of strategies.</p> <p>EU 3.3: The Fundamental Theorem of Calculus, which has two distinct formulations, connects differentiation and integration.</p>

Unit 6: Differential Equations	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
<p>Lesson 1: Differential Equations; Initial Value Problems</p> <p>Lesson 2: Slope Fields</p> <p>Lesson 3: Definite Integrals</p> <p>Lesson 4: Anti-differentiation by Parts</p> <p>Lesson 5: Separation of Variables</p> <p>Lesson 6: Exponential Growth and Decay</p> <p>Lesson 7: Logistic Growth; Partial Fraction Decomposition</p>	<ul style="list-style-type: none"> • Estimate solutions to differential equations • Verify solutions to differential equations. • Analyze functions defined by an integral • Apply definite integrals to problem involving the average value of a function • Analyze differential equations to obtain general and specific solutions • Interpret, create, and solve differential equations from problems in context • Anti-differentiate by Parts • Solve logistic growth problems by Partial Fraction Decomposition 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.</p>	<p>EU 3.4: The definite integral of a function over an interval is a mathematical tool with many interpretations and applications involving accumulation.</p> <p>EU 3.5: Anti-differentiation is an underlying concept involved in solving separable differential equations involves determining a function or relation given its rate of change.</p>

Unit 7: Applications of Definite Integrals	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
<p>Lesson 1: The Definite Integral as Net Change</p> <p>Lesson 2: Area Between Two Curves</p> <p>Lesson 3: Volumes by Cross-Section and Rotation</p> <p>Lesson 4: Lengths of Curves</p>	<ul style="list-style-type: none"> • Interpret the meaning of a definite integral within a problem • Apply definite integrals to problems involving the average value of a function • Apply definite integrals to problems involving motion • Apply definite integrals to problems involving area and volume • Interpret, create, and solve differential equations from problems in context • Find the length of curves using accumulation 	<p>Daily homework assignments</p> <p>In-class notes or guided note worksheets</p> <p>2 to 3 quizzes</p> <p>1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.</p>	<p>EU 3.4: The definite integral of a function over an interval is a mathematical tool with many interpretations and applications involving accumulation.</p>

Unit 8: Sequences, l'Hôpital's Rule and Improper Integrals	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
Lesson 1: Sequences Lesson 2: l'Hôpital's Rule Lesson 3: Relative Rates of Growth Lesson 4: Improper Integrals	<ul style="list-style-type: none"> • Apply the concept of limits to sequences determining convergence • Apply l'Hôpital's Rule to find derivatives of functions in indeterminate form • Determine the relative rates of growth of functions using limits to infinity • Evaluate improper integrals using limits of an antiderivative 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.	EU 1.1: The concept of a limit can be used to understand the behavior of a function. EU 3.2: The definite integral of a function over an interval is the limit of a Riemann sum over that interval and can be calculated using a variety of strategies.

Unit 9: Parametric, Vector, and Polar Functions	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
Lesson 1: Parametric Functions Lesson 2: Vectors in the Plane Lesson 3: Polar Functions	<ul style="list-style-type: none"> • Graph parametric curves in the plane • Determine arc length of parametric curves • Determine the velocity, speed, acceleration and direction of motion of a curve defined by a vector function • Find the area enclosed by and length of polar curves 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test	EU 2.3: The derivative has multiple interpretations and applications including those that involve instantaneous rates of change. EU 3.4: The definite integral of a function over an interval is a mathematical tool with many interpretations and applications involving accumulation.

Unit 10: Infinite Series	Student will be able to:	Assessments	College Board - AP Calculus Curriculum Framework
Lesson 1: Power Series Lesson 2: Taylor Series Lesson 3: Taylor's Theorem Lesson 4: Radius of Convergence Lesson 5: Testing Convergence at Endpoints	<ul style="list-style-type: none"> • Identify a series • Represent functions by series • Construct a series • Combine Taylor Series • Construct Taylor Polynomials • Apply the Remainder Estimation Theorem to prove convergence • Find the radius of convergence • Apply the Ratio Test and the nth-Term Test to prove convergence • Find the interval of convergence • Perform additional test for convergence 	Daily homework assignments In-class notes or guided note worksheets 2 to 3 quizzes 1 Common departmental test - Includes released multiple choice and free response questions from previous AP exams.	EU 4.1: The sum of an infinite number of real numbers may converge. EU 4.2: A function can be represented by an associated power series over the interval of convergence for the power series.

Textbooks

Algebra 1 – 6113	Algebra 1, Pearson Prentice-Hall, 2004 Bellman, et al.; ISBN-13: 978-0133659467
Geometry CP – 6213	Geometry, Pearson Prentice-Hall, 2005 Kennedy, et al.; ISBN-13: 978-0131339972
Geometry Honors – 6214	Geometry, Glencoe, 2005 Boyd, et al.; ISBN-13: 978-0078651069
Algebra 2 CP – 6313	Algebra 2, Pearson Prentice-Hall, 2005 Kennedy, et al.; ISBN-13: 978-0131339989
Algebra 2 Honors – 6314	Algebra 2, Glencoe, 2005 Cuevas, et al.; ISBN-13: 978-0078656095
Precalculus CP – 6413	Precalculus, Pearson Prentice-Hall, 2004 Sullivan; ISBN-13: 978-0131924963
Precalculus Honors – 6414	Precalculus, Pearson Prentice-Hall, 2007 Demana, Waits, Foley, Kennedy; ISBN-13: 978-0131369061
Statistics CP – 6	Intro Stats, Pearson, 2018, DeVeaux, Velleman, Bock: ISBN-13: 978-0134210223
Calculus CP – 6423	Calculus: Graphical, Numerical, Algebraic, Pearson Prentice-Hall, 2007 Finney, Demana, Waits, Kennedy; ISBN-13: 978-0132014083
AP Statistics -	Stats:Modeling the World, Addison Wesley Longman , 2003 Bock, Velleman, De Veaux; ISBN-: 9780201737356
AP Calculus AB and BC – 6425, 6435	Calculus: Graphical, Numerical, Algebraic, Pearson Prentice-Hall, 2007 Finney, Demana, Waits, Kennedy; ISBN-13: 978-0132014083

Other Resources

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<https://www.ck12.org/teacher/>; Flexbook Platform, ©CK-12 Foundation; 2018