Algebra II

Overview
Algebra II is a continuation of Algebra I, going into more depth in many subjects. Students will review basic concepts of algebra such as inequalities and proofs, linear equations and functions, and work with polynomials. They will also be introduced to algebraic concepts such as rational expressions, rational and complex numbers, quadratic equations and functions, variation and polynomial equations, analytic geometry, exponential and logarithmic functions, sequences and series, statistics and probability, and matrices and determinants. Finally, they will have a brief introduction to trigonometry.

Course Rationale: This course serves as a prerequisite for Pre-Calculus. It covers material that is tested on the Michigan Merit Exam, which includes the ACT. The successful completion of Algebra II is required by the State of Michigan as a graduation requirement.

Grades: 10-11 (typically taken after successful completion of Geometry)

Prerequisites: Successful completion of Algebra I and Geometry (or permission from instructor)

Other: 2 Trimesters

Units of Study

	Unit Title	Length of Study
Algebra II A	Algebra Concepts	15 school days
	Linear Equations	13 school days
	Factors of Polynomials and Rational Expressions	25 school days
Algebra II B	Irrational and Complex Numbers	10 school days
	Quadratic Equations and Functions	9 school days
	Geometry and Trigonometric	7 school days
	Statistics and Probability	11 school days
	Matrices and Determinants	7 school days
	Exponential and Logarithmic Functions	7 school days
	Trigonometric Functions	If Time Permits

Mathematics Core Units

Course Title: Algebra II **Unit Title:** Algebra Concept Review **Length of Unit:** 15 School Days

Grade Level: 10th-12th grades

COMMON CORE STANDARDS COVERED Major topics included in this unit	UNIT BENCHMARKS (I CAN STATEMENTS) What do you want students to know, do, and be like?	Key Vocabulary	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
A.SSE.1 Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors, and coefficients. **A.CED.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. **A.CED.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **A.REI.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. **A.REI.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. **A.REI.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). **A.APR.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.	I Can… …graph real numbers on a number line and use the number line to compare. …simplify an algebra expression (using the orders of operations). …use the properties of real numbers (commutative, associative, identity, distributive, etc). …add, subtract, multiply and divide real numbers. …solve an equation that contains one variable. …translate word phrases into an algebra expression …solve inequalities that have one variable. …solve a conjunction and a disjunction. …solve an inequality word problem that has one variable. …solve open sentences that involve an absolute value. …	Absolute Value Conjunction Disjunction Distributive Property Empty/Null Set Inequality Opposites Variable	1. Daily homework assignments 2. Questioning in class during instruction/lecture/notes and independent work time 3. Warm up as entrance questions or exit slips 4. Work independently with students as needed—during class time, before and after school and during lunch 5. Chapter Quizzes 6. Chapter Test	**Technology** • Use television to display the objective of the day • Use overhead to present notes and examples so everyone can clearly see and I can see who is struggling • Calculator—Ti34 Multiview and Ti-Nspire **Print Material** • Textbook • ACT resource book • Online printed resources • Graph paper as needed • Written review sheets • Chapter Quiz(s) • Chapter Test

Mathematics Core Units

Course Title: Algebra II **Unit Title:** Linear Equations **Length of Unit:** 13 School Days

Grade Level: 10th-12th grades **Page** 2 **of** 14

COMMON CORE STANDARDS COVERED Major topics included in this unit	UNIT BENCHMARKS (I CAN STATEMENTS) What do you want students to know, do, and be like?	Key Vocabulary	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
A.REI.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. **F.IF.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. **A.SSE.1** Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors, and coefficients. **A.REI.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. **A.REI.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. **A.REI.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	I Can… …solve an open sentence that has two variables …graph a linear equation that has two variables. …find the slope of a line. …graph a line when given only the slope and a point on it. …find the equation of a line when given information that describes the line: when given 2 points when given a slope and intercept when given a slope and a point …solve a system of linear equations …graph linear inequalities with two variables …graph systems of linear inequalities with two variables …find the value of a function and graph that function …find the equation of a linear function …determine the difference between a relation and a function	Coordinate Plane Function (domain and range) Linear Combination Linear Functions Open Sentence Ordered Pair Point Slope Form Relations Slope Slope Intercept Form Solution Set Standard Form System of Inequalities Vertical Line Test X Coordinate (abscissa) Y Coordinate (ordinate)	1. Daily homework assignments 2. Questioning in class during instruction/lecture/notes and independent work time 3. Warm up as entrance questions or exit slips 4. Work independently with students as needed—during class time, before and after school and during lunch 5. Chapter Quizzes 6. Chapter Test	**Technology** • Use television to display the objective of the day • Use overhead to present notes and examples so everyone can clearly see and I can see who is struggling • Calculator—Ti34 Multiview and Ti-Nspire **Print Material** • Textbook • ACT resource book • Online printed resources • Graph paper as needed • Written review sheets • Chapter Quiz(s) • Chapter Test **Web Resources**

the same solutions. **A.REI.6** Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. **A.REI.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). **A.REI.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. **A.REI.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.				

Mathematics Core Units

Course Title: Algebra II **Unit Title:** Factors of Polynomials and Rational Expressions **Length of Unit:** 25 School Days

Grade Level: 10th-12th grades **Page** 4 **of** 14

COMMON CORE STANDARDS COVERED Major topics included in this unit	UNIT BENCHMARKS (I CAN STATEMENTS) What do you want students to know, do, and be like?	Key Vocabulary	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
A.CED.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. **A.CED.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **A.CED.3** Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. **A.CED.4** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R. **A.SSE.1** Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors, and coefficients. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret P(1+r)n as the product of P and a factor not depending on P. **A.SSE.2** Use the structure of an expression to identify ways to rewrite it. For example, see x4 – y4 as (x2)2 – (y2)2, thus recognizing it as a difference of squares that can be factored as (x2 – y2)(x2 + y2). **A.APR.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	I Can… …add, subtract and simplify polynomials. …use the laws of exponents. …multiply polynomials by monomials. …find the GCF (greatest common factor) and LCM (least common multiply) of both integers and monomials. …factor polynomials—using the GCF and looking for patterns. …factor quadratic polynomials. …solve a polynomial equation (by setting every factor equal to zero). …solve a polynomial inequality. …simplify quotients using the laws of exponents. …work with problems that have negative and zero exponents. …write a number in scientific notation. …simplify a rational algebra expression. (using factoring). …add, subtract, multiply and divide rational expressions. …simply a complex fraction (a fraction within a fraction).	Binomial Complex Fractions Degree of Monomials Degree of Polynomial Degree of Variables Difference of Squares Extraneous Root Factor Fractional Coefficients Greatest Common Factor Laws of Exponents LCD (Least Common Denominator) Least Common Multiple Monomial Perfect Square Trinomials Polynomial Polynomial Inequality Quadratic Root or Solution Scientific Notation Sum/Difference of Cubes	1. Daily homework assignments 2. Questioning in class during instruction/lecture/notes and independent work time 3. Warm up as entrance questions or exit slips 4. Work independently with students as needed—during class time, before and after school and during lunch 5. Chapter Quizzes 6. Chapter Test	**Technology** • Use television to display the objective of the day • Use overhead to present notes and examples so everyone can clearly see and I can see who is struggling • Calculator—Ti34 Multiview and Ti-Nspire **Print Material** • Textbook • ACT resource book • Online printed resources • Graph paper as needed • Written review sheets • Chapter Quiz(s) • 2 Unit or Chapter Tests **Web Resources** Online worksheets from: http://www.kutasoftware.com/FreeWorksheets/Alg1Worksheets/Simplifying%20Rational%20Expressions.pdf

A.APR.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). **A.APR.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. **A.APR.4** Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity (x2 + y2)2= (x2 – y2)2 + (2xy)2 can be used to generate Pythagorean triples. **A.APR.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. **A.APR.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. **A.REI.2** Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. **A.REI.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. **F.IF.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. **A.APR.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.	…simplify a fractional coefficient …solve a fractional equation.			

Mathematics Core Units

Course Title: Algebra II **Unit Title:** Irrational and Complex Numbers **Length of Unit:** 10 School Days

Grade Level: 10th-12th grades **Page** 6 **of** 14

COMMON CORE STANDARDS COVERED Major topics included in this unit	UNIT BENCHMARKS (I CAN STATEMENTS) What do you want students to know, do, and be like?	Key Vocabulary	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
N.RN.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. *For example, we define* $5^{1/3}$ *to be the cube root of 5 because we want* $(5^{1/3})^3 = 5^{(1/3)3}$ *to hold, so* $(5^{1/3})^3$ *must equal 5.* N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents. N.CN.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. N.CN.2 Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers. N.CN.7 Solve quadratic equations with real coefficients that have complex solutions. N.CN.8 (+) Extend polynomial identities to the complex numbers. *For example, rewrite* $x^2 + 4$ *as* $(x + 2i)(x - 2i)$.	I Can… …find the roots of real numbers (both square and cube roots). …simplify an expression that involves radicals. …simplify an expression that involves the sum of radicals. …multiply 2 binomials that contain radicals by FOIL(ing). …solve an equation that contains radicals. …convert decimals o fractions and fractions to decimals. …use the imaginary number i to simplify a square root. …add, subtract, multiply and divide complex numbers (a + bi) …	Properties of Radicals Conjugates Rational Number Irrational Number Square Root Cube Root Radical Radicand Index of a Radical Radical Equation Imaginary Numbers Complex Numbers Terminating Decimal Repeating Decimal	1. Daily homework assignments 2. Questioning in class during instruction/lecture/notes and independent work time 3. Warm up as entrance questions or exit slips 4. Work independently with students as needed—during class time, before and after school and during lunch 5. Chapter Quizzes 6. Chapter Test	**Technology** • Use television to display the objective of the day • Use overhead to present notes and examples so everyone can clearly see and I can see who is struggling • Calculator—Ti34 Multiview and Ti-Nspire **Print Material** • Textbook • ACT resource book • Online printed resources • Graph paper as needed • Written review sheets • Chapter Quiz(s) • Chapter Test **Web Resources** Online worksheets from: http://www.kutasoftware.com/FreeWorksheets/Alg2Worksheets/Operations%20with%20Complex%20Numbers.pdf

Mathematics Core Units

Course Title: Algebra II **Unit Title:** Quadratic Equations and Functions **Length of Unit:** 9 School Days

Grade Level: 10th-12th grades **Page** 7 **of** 14

COMMON CORE STANDARDS COVERED Major topics included in this unit	UNIT BENCHMARKS (I CAN STATEMENTS) What do you want students to know, do, and be like?	Key Vocabulary	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
A.CED.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.* A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.* A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.* F.IF.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.* A.REI.4 Solve quadratic equations in one variable. a. Use the method of completing the	I Can… …use completing the square to solve a quadratic equation. …use the quadratic formulas to solve a quadratic equation. …find the discriminant and use it to determine the nature of the roots without actually having to find the roots. …solve equations that are in the quadratic form (using substitution). …graph parabolas given their equation and find: the direction they open the vertex the axis of symmetry the x-intercepts the y-intercepts the domain the range the maximum/minimum value	Axis of Symmetry Completing the Square Discriminant Equation Parabolas Quadratic Quadratic Formula Vertex X and Y Intercepts	1. Daily homework assignments 2. Questioning in class during instruction/lecture/notes and independent work time 3. Warm up as entrance questions or exit slips 4. Work independently with students as needed—during class time, before and after school and during lunch 5. Chapter Quizzes 6. Chapter Test	**Technology** • Use television to display the objective of the day • Use overhead to present notes and examples so everyone can clearly see and I can see who is struggling • Calculator—Ti34 Multiview and Ti-Nspire **Print Material** • Textbook • ACT resource book • Online printed resources • Graph paper as needed • Written review sheets • Chapter Quiz(s) • Chapter Test **Web Resources** On line worksheet on parabolas from: http://www.sanjuan.edu/webpages/mnarlesky/algebra.cfm?subpage=167597 http://www.kutasoftware.com/FreeWorksheets/Alg1Worksheets/Solving%20Completing%20Square.pdf

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. 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. A.CED.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*. F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period,midline, and amplitude.				

Mathematics Core Units

Course Title: Algebra II **Unit Title:** Geometry and Trigonometric **Length of Unit:** 7 School Days

Grade Level: 10th-12th grades

COMMON CORE STANDARDS COVERED Major topics included in this unit	UNIT BENCHMARKS (I CAN STATEMENTS) What do you want students to know, do, and be like?	Key Vocabulary	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
	I Can… …divide one polynomial by another polynomial using long division. …divide one polynomial by another polynomial using synthetic division. …find the distance between two points. …find the midpoint between two points. …write the equation of a circle when given the center and radius. …graph a circle when given its equation. …determine if a given equation is a circle and if so find the center and radius.	Center Circle Distance formula Divisional algorithm Midpoint formula Pythagorean theorem Radius Synthetic division	1. Daily homework assignments 2. Questioning in class during instruction/lecture/notes and independent work time 3. Warm up as entrance questions or exit slips 4. Work independently with students as needed—during class time, before and after school and during lunch 5. Chapter Quizzes 6. Chapter Test	**Technology** • Use television to display the objective of the day • Use overhead to present notes and examples so everyone can clearly see and I can see who is struggling • Calculator—Ti34 Multiview and Ti-Nspire **Print Material** • Textbook • ACT resource book • Online printed resources • Graph paper as needed • Written review sheets • Chapter Quiz(s) • Chapter Test

Mathematics Core Units

Course Title: Algebra II **Unit Title:** Statistics and Probability **Length of Unit:** 11 School Days

Grade Level: 10th-12th grades **Page** 10 **of** 14

COMMON CORE STANDARDS COVERED Major topics included in this unit	UNIT BENCHMARKS (I CAN STATEMENTS) What do you want students to know, do, and be like?	Key Vocabulary	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
S.ID.4 Use the mean and standard deviation of a dataset 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. S.IC.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population. S.IC.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? S.IC.3 Recognize the purposes of and differences A.APR.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 among sample surveys, experiments, and observational studies; explain how randomization relates to each. S.IC.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.	I Can… …display data using a frequency distribution, histogram and stem-and-leaf plot. …find, compare and describe the measures of central tendency (mean, median and mode) and dispersion (range, quartiles, variance and standard deviation). …recognize and analyze a normal distribution using the mean and standard deviation of a data set. …use calculators and tables to estimate the area under the normal curve. …draw a scatter plot for a set of data and use the data to determine the correlation coefficient and regression line. I can use the regression line to make inferences about data. …apply the fundamental counting principles (to figure out the number of possible options). …find the number of permutations and combinations of a set of data. I understand the difference between permutations and combinations. … state the sample space and the events for a random experiment. …find the probability that an event will occur. …determine if events are mutually	Box-and-Whisker Plot Combination Correlation Coefficient Event First, Third Quartiles Frequency Distribution Histogram Independent Events Intersection Measures of Central Tendency Measures of Dispersions Mutually Exclusive Normal Distribution Permutation Probability Random Experiment Range Regression Line Sample Space Standard Deviation Statistics Stem-and-Leaf Plot Variance Venn Diagram	1. Daily homework assignments 2. Questioning in class during instruction/lecture/notes and independent work time 3. Warm up as entrance questions or exit slips 4. Work independently with students as needed—during class time, before and after school and during lunch 5. Chapter Quizzes 6. Chapter Test	**Technology** • Use television to display the objective of the day • Use overhead to present notes and examples so everyone can clearly see and I can see who is struggling • Calculator—Ti34 Multiview and Ti-Nspire **Print Material** • Textbook • ACT resource book • Online printed resources • Graph paper as needed • Copy of the Area Under a Standard Curve Table • Written review sheets • Chapter Quiz(s) • Chapter Test **Web Resources**

S.IC.5 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant. S.IC.6 Evaluate reports based on data. S.MD.6 (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator). S.MD.7 (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).	exclusive and independent events and find the probability of these events. …draw a Venn diagram to display data and/or use a given Venn diagram to explain a set of data.			

Mathematics Core Units

Course Title: Algebra II **Unit Title:** Matrices and Determinants **Length of Unit:** 7 School Days

Grade Level: 10th-12th grades **Page** 12 **of** 14

COMMON CORE STANDARDS COVERED Major topics included in this unit	UNIT BENCHMARKS (I CAN STATEMENTS) What do you want students to know, do, and be like?	Key Vocabulary	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
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.12 (+) Work with 2 × 2 matrices as a transformations of the plane, and interpret the absolute value of the determinant in terms of area	I Can… …find the missing values in a matrix. …determine the dimensions of a matrix. …add and subtract two matrices. …do scalar multiplication. …determine if two matrix can be multiplied and if so I can perform matrix multiplication. …find the determinant of a 2 x 2 matrix. …find the determinant of a 3 x 3 matrix. …use the determinant of a matrix to determine if an inverse of that matrix exists. …use the determinant of a matrix to find the inverse matrix. …use matrices to find the solution to a system of equations.	Additive inverse of matrix Column matrix Column of a matrix Determinant Dimensions of a matrix Elements of matrix Identity matrix Inverse matrices Matrix Matrix multiplication Order of a determinant Row matrix Row of a matrix Scalar Square matrix Subtraction of matrices Sum of matrices Zero matrix	Daily homework assignments Questioning in class during instruction/lecture/notes and independent work time Warm up as entrance questions or exit slips Work independently with students as needed—during class time, before and after school and during lunch Chapter Quizzes Chapter Test	Technology Use television to display the objective of the day Use overhead to present notes and examples so everyone can clearly see and I can see who is struggling Calculator—Ti34 Multiview and Ti-Nspire Print Material Textbook ACT resource book Online printed resources Graph paper as needed Written review sheets Chapter Quiz(s) Chapter Test

Mathematics Core Units

Course Title: Algebra II **Unit Title:** Exponential and Logarithmic Functions **Length of Unit:** 7 School Days

Grade Level: 10th-12th grades **Page** 13 **of** 14

COMMON CORE STANDARDS COVERED Major topics included in this unit	UNIT BENCHMARKS (I CAN STATEMENTS) What do you want students to know, do, and be like?	Key Vocabulary	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
F.BF.4 Find inverse functions. 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. For example, f(x) = 2 x3 or f(x) = (x+1)/(x-1) for x ≠ F.BF.1 Write a function that describes a relationship between two quantities.. Combine standard function types using arithmetic operations. F.IF.7d Analyze functions using different representations. Logarithmic and trigonometric functions	I Can… …simplify numbers that have rational exponents (especially fractions as exponents). …solve equations that have rational exponents (especially fractions as exponents). …write a value in simplest radical form. …write a value in exponential form. …simplify something that has a irrational number as an exponent. …find the composition of two functions f and g. …use the horizontal line test to determine if a function has an inverse. …convert something from exponential form to logarithmic form. …convert something from logarithmic form to exponential form. …simplify a logarithm. …use the laws of logarithms.	Composite Composition Exponential equation Exponential form Horizontal line test Inverse functions Laws of logarithms Logarithm Logarithmic functions Rational exponents	1. Daily homework assignments 2. Questioning in class during instruction/lecture/notes and independent work time 3. Warm up as entrance questions or exit slips 4. Work independently with students as needed—during class time, before and after school and during lunch 5. Chapter Quizzes 6. Chapter Test	**Technology** • Use television to display the objective of the day • Use overhead to present notes and examples so everyone can clearly see and I can see who is struggling • Calculator—Ti34 Multiview and Ti-Nspire **Print Material** • Textbook • ACT resource book • Online printed resources • Graph paper as needed • Written review sheets • Chapter Quiz(s) • Chapter Test

Mathematics Core Units

Course Title: Algebra II **Unit Title:** Trigonometric Functions **Length of Unit:** If Time Permits

Grade Level: 10th-12th grades **Page** 14 **of** 14

COMMON CORE STANDARDS COVERED Major topics included in this unit	UNIT BENCHMARKS (I CAN STATEMENTS) What do you want students to know, do, and be like?	Key Vocabulary	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
F.TF.1 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle. F.TF.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. F.TF.5 Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline. F.TF.8 Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find sin (θ), cos (θ), or tan (θ), given sin (θ), cos (θ), or tan (θ), and the quadrant of the angle.	I Can… … use radians to measure angles …define a circular function …determine if a function is even, odd or neither. …graph the sine and cosine. …find the amplitude of a function …find the maximum and minimum values of a function. …find the period of a function	Amplitude Arc length Area of a sector Circular functions Even function Odd function Period Radian measure	1. Daily homework assignments 2. Questioning in class during instruction/lecture/notes and independent work time 3. Warm up as entrance questions or exit slips 4. Work independently with students as needed—during class time, before and after school and during lunch 5. Chapter Quizzes 6. Chapter Test	**Technology** • Use television to display the objective of the day • Use overhead to present notes and examples so everyone can clearly see and I can see who is struggling • Calculator—Ti34 Multiview and Ti-Nspire **Print Material** • Textbook • ACT resource book • Online printed resources • Graph paper as needed • Written review sheets • Chapter Quiz(s) • Chapter Test