Xavier High School Micronesia
Algebra II Curriculum

UBD Quarters 1-4

Major Topics Covered/ Guiding Questions:	**Materials/Resources (Please specify if these are distributed to each individual student, given to groups of students, posted online for all students, or just to be used by teacher):**
• Real Numbers and Functions • Linear Equations and Inequalities • Matrices • Quadratic Functions • Statistics and Probability • Trigonometry	• Notebook to be used only for Algebra II (Students) • Binder/Folder to be used only for Algebra II (Students and Teacher) • Pencil (Pens are not recommended) - (Students) • Desmos Test Mode Calculator App for Smartphones (Students - Teacher will use TI-84 and Desmos) • Algebra II Textbook available on Google Classroom/Teacher Resource Website (Students and Teacher)
Skills students will develop: • Use a scientific/ graphing calculator/app • apply properties of real numbers • Apply properties of square roots and exponents are emphasized • Translate words to algebraic expressions • Work with number lines • Apply definitions of relations, functions, function notation, domain, and range • Use equations and inequalities to solve problems involving proportion, perimeter, motion, coins, consecutive integers, and averages • Apply systems of equations in problems and real-life situations • Apply matrices to real-life situations • Appropriately select a method to solve systems of linear equations • Factoring quadratic equations • find the axis of symmetry and vertex of a parabola • determine whether the vertex of a parabola is a maximum or minimum point • Graph solutions on number lines • Use the fundamental counting principle, permutations, and combinations • Work with mean, median, and mode to determine probability	**By the end of the year students will be able to _____ (must be measurable by assessments)** • solve literal equations or formulas for one of the variables • solve equations involving absolute value • solve equations involving absolute value and graph the solution sets • solve problems using equations and inequalities; • solve a problem by making drawing or a table. • find the solution of a linear system of equations in two variables • determine whether a linear system of equations is consistent or inconsistent and dependent and independent • solve a linear system in two variables by graphing • solve a linear system in two variables by elimination or substitution • solve story problems using systems of equations • graph linear inequalities with two variables • solve linear systems of inequalities in two variables graphically • solve problems using linear programming • put data into matrix form • find the sum and difference of two matrices and the product of a matrix and a scalar • find the product of two matrices • solve problems using matrices

• understand the difference between a biased and an unbiased sample • conduct a simple experiment involving a simulation of random movement • Understand and apply the laws of sines and cosines • convert degree measure to radian measure and vice versa • Solve triangles • Simplify trigonometric expressions • define and use the inverse trigonometric functions • Work with vectors	• solve a system of linear equations using augmented matrix method • find the inverse of a matrix and to use it to solve a system of equations • evaluate the determinant of a 2 x 2 or a 3 x 3 matrix; • solve systems of equations using Cramer's rule • write a system of equations from a story problem • Graph quadratic equations • write a quadratic function in transformation, polynomial, and x-intercept form • find the axis of symmetry and the vertex of a parabola and tell whether the vertex is a maximum or a minimum point; • sketch the graph of a quadratic function using the axis of symmetry, the vertex, and the intercepts; • solve quadratic equations by completing the square and by using the quadratic formula; • use the discriminant to determine the nature of the solutions of a quadratic equation; • determine the relationship between the nature of the solutions and the graph of a quadratic function; • solve equations in quadratic form and to solve and graph quadratic inequalities; • solve problems by using quadratic equations • use the Fundamental Counting Principle; • find the number of permutations and the number of combinations of n elements taken *r* at a time; • specify the sample space for a random experiment; • calculate the probability that a given event will occur and the probability of mutually exclusive events and of independent events; • find the mean, median, mode, and standard deviation of a set of data • construct a histogram from a frequency distribution • use the normal distribution to find probabilities; • solve problems using sampling and hypothesis testing. • measure angles in degrees and radians;

	• define the six trigonometric functions and find the value of the trigonometric functions for 30^0, 45^0, 60^0, quadrantal angles; • find decimal approximation for the values of the trigonometric functions of angles; • find the measure of an acute angle, given the value of one of its trigonometric functions; • graph the sine, cosine, tangent, secant, cosecant, and cotangent functions; • find the measure of the sides and angles of a right triangle and the area of a triangle, given the measure of two sides and the included angle; • use the law of sines and cosines to solve a triangle; • use the fundamental identities to simplify trigonometric expressions and prove trigonometric identities by using the fundamental identities; • use the sum and difference identities to find exact values of the trigonometric functions for certain angles; • use the double-angle identities and half-angle formulas to find the exact value of certain angle; • define and use the inverse trigonometric functions; • solve trigonometric equations; • find the sum and difference of two vectors; multiply a vector by scalar, and find the norm and bearing of a vector; • define and use polar coordinates and express complex numbers in polar form; • solve problems by using trigonometry.
Major Assessments/Projects: Two unit tests per quarter, one final exam per semester. Quizzes will be given on a regular basis to assess proficiency in given topics. Generally speaking, there is one quiz in between every test.	

UBD Quarter 1

Major Topics Covered/Guiding Questions:	**Materials/Resources (Please specify if these are distributed to each individual student, given to groups of students, posted online for all students, or just to be used by teacher):**
● Real Numbers & Functions ● Linear Equations & Inequalities	● Notebook to be used only for Algebra II (Students) ● Binder/Folder to be used only for Algebra II (Students and Teacher) ● Pencil (Pens are not recommended) - (Students) ● Desmos Test Mode Calculator App for Smartphones (Students - Teacher will use TI-84 and Desmos) ● Algebra II Textbook available on Google Classroom/Teacher Resource Website (Students and Teacher)
Skills students will develop: ● Use a scientific/ graphing calculator/app ● apply properties of real numbers ● Apply properties of square roots and exponents are emphasized ● Translate words to algebraic expressions ● Work with number lines ● Apply definitions of relations, functions, function notation, domain, and range ● Use equations and inequalities to solve problems involving proportion, perimeter, motion, coins, consecutive integers, and averages ● Apply systems of equations in problems and real-life situations	**By the end of the quarter students will be able to _____ (must be measurable by assessments):** ● solve linear inequalities in one variable and graph their solution sets; ● determine the truth or falsity of conjunctions and disjunctions; ● compound sentences involving inequalities and graph the solution sets; ● classify numbers ● simplify exponential expressions ● use function notation ● know when a relation is or is not a function ● solve literal equations or formulas for one of the variables; ● solve equations involving absolute value; ● solve equations involving absolute value and graph the solution sets; ● solve problems using equations and inequalities; ● solve a problem by making drawing or a table. ● find the solution of a linear system of equations in two variables; ● determine whether a linear system of equations is consistent or inconsistent and dependent and independent; ● solve a linear system in two variables by graphing; ● solve a linear system in two variables by elimination or substitution;

	• solve story problems using systems of equations; • graph linear inequalities in two variable; • solve linear systems of inequalities in two variables graphically; • solve problems using linear programming
Major Assessments/Projects: 1 Test covering real numbers and functions, 1 test covering solving linear equations and inequalities/systems of equations and inequalities	

UBD Quarter 2

Major Topics Covered/Guiding Questions:	**Materials/Resources (Please specify if these are distributed to each individual student, given to groups of students, posted online for all students, or just to be used by teacher):**
• Matrices • Factoring linear equations and uses of factoring • Advanced methods for solving systems of equations	• Notebook to be used only for Algebra II (Students) • Binder/Folder to be used only for Algebra II (Students and Teacher) • Pencil (Pens are not recommended) - (Students) • Desmos Test Mode Calculator App for Smartphones (Students - Teacher will use TI-84 and Desmos) • Algebra II Textbook available on Google Classroom/Teacher Resource Website (Students and Teacher)
Skills students will develop: • Apply matrices to real-life situations • Appropriately select a method to solve systems of linear equations • Apply systems of linear equations and inequalities to real-life situations	**By the end of the quarter students will be able to _____ (must be measurable by assessments):** • put data into matrix form • find the sum and difference of two matrices and the product of a matrix and a scalar; • Solve systems of linear equations using graphing, substitution, and elimination • Solve systems of linear inequalities using graphing • find the product of two matrices; • solve problems using matrices; • solve a system of linear equations using augmented matrix method; • find the inverse of a matrix and to use it to solve a system of equations; • evaluate the determinant of a 2 x 2 or a 3 x 3 matrix; • solve systems of equations using Cramer's rule; • write a system of equations from a story problem;
Major Assessments/Projects: 1 test covering systems of equations, factoring, and introductory matrices, second test covering entire matrices Final Exam for first semester	

UBD Quarter 3

Major Topics Covered/Guiding Questions:

- Quadratic Functions

Materials/Resources (Please specify if these are distributed to each individual student, given to groups of students, posted online for all students, or just to be used by teacher):

- Notebook to be used only for Algebra II (Students)
- Binder/Folder to be used only for Algebra II (Students and Teacher)
- Pencil (Pens are not recommended) - (Students)
- Desmos Test Mode Calculator App for Smartphones (Students - Teacher will use TI-84 and Desmos)
- Algebra II Textbook available on Google Classroom/Teacher Resource Website (Students and Teacher)

Skills students will develop:

- Appropriately select a method to solve systems of linear equations
- Factoring quadratic equations
- find the axis of symmetry and vertex of a parabola
- determine whether the vertex of a parabola is a maximum or minimum point
- Graph solutions on number lines

By the end of the quarter students will be able to _____ (must be measurable by assessments):

- graph quadratic functions of the form $y = ax^2 + bx + c$;
- write a quadratic function in transformation, polynomial, and x-intercept form
- find the axis of symmetry and the vertex of a parabola and tell whether the vertex is a maximum or a minimum point;
- sketch the graph of a quadratic function using the axis of symmetry, the vertex, and the intercepts;
- solve quadratic equations by completing the square and by using the quadratic formula;
- use the discriminant to determine the nature of the solutions of a quadratic equation;
- determine the relationship between the nature of the solutions and the graph of a quadratic function;
- solve equations in quadratic form and to solve and graph quadratic inequalities;
- solve problems by using quadratic equations.

Major Assessments/Projects: Graphing quadratic equations/Parabolas Test, Quadratic formula and solving problems with quadratic equations test.

UBD Quarter 4

Major Topics Covered/Guiding Questions:	**Materials/Resources (Please specify if these are distributed to each individual student, given to groups of students, posted online for all students, or just to be used by teacher):**
● Statistics and Probability ● Trigonometry	● Notebook to be used only for Algebra II (Students) ● Binder/Folder to be used only for Algebra II (Students and Teacher) ● Pencil (Pens are not recommended) - (Students) ● Desmos Test Mode Calculator App for Smartphones (Students - Teacher will use TI-84 and Desmos) ● Algebra II Textbook available on Google Classroom/Teacher Resource Website (Students and Teacher)
Skills students will develop: ● find the axis of symmetry and vertex of a parabola ● determine whether the vertex of a parabola is a maximum or minimum point ● Graph solutions on number lines ● Use the fundamental counting principle, permutations, and combinations ● Work with mean, median, and mode to determine probability ● understand the difference between a biased and an unbiased sample	**By the end of the quarter students will be able to _____ (must be measurable by assessments):** ● use the Fundamental Counting Principle; ● find the number of permutations and the number of combinations of n elements taken *r* at a time; ● specify the sample space for a random experiment; ● calculate the probability that a given event will occur and the probability of mutually exclusive events and of independent events; ● find the mean, median, mode, and standard deviation of a set of data; ● construct a histogram from a frequency distribution; ● use the normal distribution to find probabilities; ● solve problems using sampling and hypothesis testing. ● measure angles in degrees and radians; ● define the six trigonometric functions and find the value of the trigonometric functions for 30^0, 45^0, 60^0, quadrantal angles; ● find decimal approximation for the values of the trigonometric functions of angles; ● find the measure of an acute angle, given the value of one of its trigonometric functions; ● graph the sine, cosine, tangent, secant, cosecant, and cotangent functions;

	• find the measure of the sides and angles of a right triangle and the area of a triangle, given the measure of two sides and the included angle; • use the law of sines and cosines to solve a triangle; • use the fundamental identities to simplify trigonometric expressions and prove trigonometric identities by using the fundamental identities; • use the sum and difference identities to find exact values of the trigonometric functions for certain angles; • use the double-angle identities and half-angle formulas to find the exact value of certain angle; • define and use the inverse trigonometric functions; • solve trigonometric equations; • find the sum and difference of two vectors; multiply a vector by scalar, and find the norm and bearing of a vector; • define and use polar coordinates and express complex numbers in polar form; • solve problems by using trigonometry.
Major Assessments/Projects: One test covering probability/statistics/permutations/combinations unit, one test covering geometry and trigonometric functions, second semester final exam.	

Helpful Online Resources

Desmos Test Mode (app for iPhone and Android)
Geogebra (download app to computer to project a graphing calculator on board)
Khan Academy videos (post in Google Classroom)