**Overview of Year**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEPT** | **OCT** | | **NOV** | | **DEC** | | **JAN** | **FEB** | | **MARCH** | | **APRIL** | | | **MAY** | | **JUNE** | |
| Unit 1  Patterns in Chance  - 7 days | | Unit 2  Common Logarithms and Exponential Equations  - 7 days | | Unit 3  Radicals and Rational Exponents  -5 days | | Unit 4  Polynomial Expressions and Functions  -10 days | | | Unit 5  Quadratic Polynomials  -8 days | | Unit 6  Statistical Reasoning  7 days | | Unit 7  High Dive  -10 days | Unit 8  A Recursive View of Functions  -7 days | | Unit 9  Standard Deviation and the Normal Curve  -7 days | | Unit 10  Inverse Functions and Common Logarithms and Their Properties  -10 days |

**Algebra 2 Mathematics Curriculum**

|  |  |  |
| --- | --- | --- |
| **Unit 1** | **Understanding** | **Essential Question** |
| Patterns in Chance | * Basic probability * Construct sample spaces for equally likely events * Addition rule for probability * Mutually exclusive and non-mutually exclusive events * Modeling probability situations using simulation * Graphing calculator skills in using random digits | How can probability situations be represented visually?  How can *P*(*A* and *B*) be computed?  Why is simulation useful in probability situations? |
| Performance Task: | | |

|  |  |  |
| --- | --- | --- |
| **Unit 2** | **Understanding** | **Essential Question** |
| Common Logarithms and Exponential Equations | * Properties of the exponential function * Concept of the logarithm * Multiple representations of the exponential function and properties of logarithms * Use of common logarithms to solve exponential equations * Graphing calculator skills in solving equations using the table and graph | What are the defining characteristics of an exponential function?  What is the relationship between exponential functions and logarithms? |
| Performance Task: | | |

|  |  |  |
| --- | --- | --- |
| **Unit 3** | **Understanding** | **Essential Question** |
| Radicals and Rational Exponents | * Solving radical equations * Equivalent exponential expressions * Solving equations using exponent rules * Meaning of rational exponents * Writing expressions with rational exponents in radical form and vice versa * Solving equations with rational exponents * Solving simple rational equations * Graphing calculator skills in solving equations using the table and graph | What are strategies for solving equations with radicals and rational exponents?  What are strategies for writing exponential expressions in equivalent forms? |
| Performance Task: | | |

|  |  |  |
| --- | --- | --- |
| **Unit 4** | **Understanding** | **Essential Question** |
| Polynomial Expressions and Functions | * Model problem situations with polynomial functions, * Properties of polynomial functions connected to the degree of the function (number of local max/min values, number of zeroes, minimum number of points needed to define a polynomial function, end behavior) * Arithmetic with polynomial expressions * Writing polynomial functions given the zeroes and another point * Finding zeroes of polynomial functions * Properties of graphs of polynomial functions with repeated zeroes * Graphing calculator skills for cubic and quartic regression, finding zeroes of polynomial functions, and factoring | What are the defining characteristics of a polynomial function?  What are the relationships between the degree of a polynomial function and the properties of a specific polynomial function? |
| Performance Task: | | |

|  |  |  |
| --- | --- | --- |
| **Unit 5** | **Understanding** | **Essential Question** |
| Quadratic Polynomials | * Completing the Square * Vertex form of quadratic functions, * Writing quadratic expressions in equivalent forms (standard, factored, vertex) * Quadratic formula * Solving quadratic equations in vertex, standard, and factored form * Writing solutions to quadratic equations in simplest radical form * Complex numbers * Arithmetic with complex numbers (addition, subtraction, and multiplication) * Writing solutions to quadratic equations in a + bi form * Graphing calculator skills in solving quadratic equations using the table and graph | What are the advantages and disadvantages of the three forms of a quadratic function; standard form, factored form, and vertex form?  What are complex numbers and how can complex numbers be used to express solutions to quadratic equations? |
| Performance Task: | | |

|  |  |  |
| --- | --- | --- |
| **Unit 6** | **Understanding** | **Essential Question** |
| Statistical Reasoning | * Characteristics of a well- designed experiment * Placebo effect * Use of sampling distributions to determine if difference of two means is statistically significant * Randomization test, * Characteristics of sample surveys, experiments, and observational studies * Relationship between randomization and type of inference and the three types of statistical studies * Concept of margin of error | What are the three major types of statistical studies?  How can statistical reasoning be used to make a decision about the effect of a treatment on an outcome? |
| Performance Task: | | |

|  |  |  |
| --- | --- | --- |
| **Unit 7** | **Understanding** | **Essential Question** |
| High Dive | * Extending the trigonometric functions to all angles, * Graphing the trigonometric functions, * Transformations of the graphs of trigonometric functions, * Identify period, frequency, midline, and amplitude from a graph, function rule, and from a verbal description, * Write trigonometric functions to model real world phenomena, * Radian measure, * Pythagorean identity | What are the defining characteristics of the trigonometric functions?  How can the trigonometric functions be used to model real world situations? |
| Performance Task: | | |

|  |  |  |
| --- | --- | --- |
| **Unit 8** | **Understanding** | **Essential Question** |
| A Recursive View of Functions | * Arithmetic sequences and the connection to linear functions * Geometric sequences and the connection to exponential functions, * Recursion * Subscript notation * Arithmetic and geometric series, * Use of arithmetic and geometric sequences and series to solve problems | What are the relationships between arithmetic and geometric sequences and linear and exponential functions?  How can arithmetic and geometric sequences and series be used to model real world situations? |
| Performance Task: | | |

|  |  |  |
| --- | --- | --- |
| **Unit 9** | **Understanding** | **Essential Question** |
| Standard Deviation and the Normal Curve | * Compute and interpret deviations from the mean * Compute, estimate, and interpret the standard deviation * Compare the standard deviation as a measure of spread to the IQR * Characteristics of the normal distribution, * Recognize the standard deviation as a measure of location * Use the mean and standard deviation to fit a data set to the normal distribution and estimate population percentages * Recognize when it is appropriate to use the standard deviation as a measure of location | What are measures of the spread in a data set and how are these measures related to measures of center?  How can measures of center and spread be used together to interpret data in context? |
| Performance Task: | | |

|  |  |  |
| --- | --- | --- |
| **Unit 10** | **Understanding** | **Essential Question** |
| Inverse Functions and Common Logarithms and Their Properties | * Conditions that guarantee the existence of an inverse function * Multiple representations of inverse functions: table, equation, graph * Strategies for finding rules for inverse functions * Find rules for inverse functions for linear and basic power functions, * Revisit common logarithms * Evaluate logarithms * Express any positive number as a power of 10 * Rewrite exponential equations in equivalent forms * Solve exponential equations using logarithms * Properties of the logarithmic function | What is an inverse function?  How can exponential functions be written in equivalent forms? |
| Performance Task: | | |