**Overview of Year**

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| **SEPT** | **OCT** | **NOV** | **DEC** | **JAN** | **FEB** | **MARCH** | **APRIL** | **MAY** | **JUNE** |
| Unit 1Patterns in Chance- 7 days | Unit 2Common Logarithms and Exponential Equations- 7 days | Unit 3Radicals and Rational Exponents-5 days | Unit 4Polynomial Expressions and Functions-10 days | Unit 5Quadratic Polynomials-8 days | Unit 6Statistical Reasoning7 days | Unit 7High Dive-10 days | Unit 8A Recursive View of Functions-7 days | Unit 9Standard Deviation and the Normal Curve-7 days | Unit 10Inverse Functions and Common Logarithms and Their Properties-10 days |

 **Algebra 2 Mathematics Curriculum**

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| **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:  |

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| **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:  |

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| **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:  |

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| **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:  |

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| **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:  |

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| **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:  |

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| **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:  |

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| **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:  |

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| **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:  |

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| **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:  |