Algebra 2

Semester A Summary:

In this course, students will learn, practice, and apply skills and strategies that will help them grow into strong mathematical thinkers. The course presents math as a complete subject to be studied, not merely sets of rules and formulas to be followed. Arriving at solutions is important, as are precision and vocabulary, but instruction does not center on procedural math only. Instead, instruction encourages depth of understanding, connections within and outside courses, flexibility of approaches, and usage of various tools. Daily instruction supports student learning of core algebraic concepts and development of procedural fluency regarding investigating functions; polynomials; polynomial functions and graphs; rational expressions and equations; complex numbers; equations and inequalities; and systems of equations. Each instructional learning object is aligned to and framed by one of eight Standards for Mathematical Practice. Students are encouraged to use visual representations of their thinking to bridge their understanding between the concrete and abstract, allowing patterns and geometric principles to come to life. In peer model videos throughout the course, the learner's peers demonstrate apply targeted mathematical skills, often using real-world examples. Instruction in 21st century skills further illustrates connections between mathematical concepts and real-world situations to support students' development of the abilities, knowledge, and expertise they need to thrive in today's world. Mathematical discussion prompts encourage students to revise misconceptions, uncover nuances in application, make connections to prior knowledge, identify patterns, and engage with vocabulary. Students are encouraged to share their thinking, justify their own solutions, read critically, and constructively critique the reasoning of others. The course is designed to support a growth mindset regarding math and encourages students to engage in productive struggle; instructional materials implicitly and explicitly remind students that mistakes are opportunities for learning and acquiring new skills. Together the course elements ensure the student grows as a mathematical thinker and develops the tools necessary for success at work and in life.

Semester A Outline

1. **Algebra 2 A Course Overview**
    1. Algebra 2 A Course Overview
2. **Polynomials**
    1. Polynomials Introduction
    2. Successive Differences
        - In this section, you will show that the 2nd differences of sequences from quadratic polynomials are constant.
        - In this section, you will show that the *n*th differences of sequences from *n*-degree polynomials are a constant value.
        - In this section, you will use successive differences to construct polynomial expressions from sequences.
    3. Polynomial Multiplication
        - In this section, you will multiply polynomials using a table.

- In this section, you will multiply polynomials using the distributive property.

4. Polynomial Division
    - In this section, you will divide polynomials by recognizing division as the inverse operation of multiplication.
    - In this section, you will divide polynomials using long division in a way analogous to dividing numbers.
5. Polynomial Operations
    - In this section, you will perform addition, subtraction, multiplication, and division on polynomials.
    - In this section, you will determine the first and last terms of polynomials resulting from addition, subtraction, multiplication, and division without performing the operations completely.
6. Polynomial Operations Prompt
7. Polynomial Operations Discussion
8. Polynomial Operations in More Than One Variable
    - In this section, you will determine sums, differences, and products of polynomials in two variables.
    - In this section, you will factor polynomials in two variables completely.
    - In this section, you will determine quotients of polynomials in two or more variables.
9. Polynomial Identities
    - In this section, you will divide polynomials by $(x + a)$ or $(x - a)$ to establish polynomial identities.
    - In this section, you will use polynomial identities to find products by framing the multiplication as the difference of two squares.
10. Polynomial Power
    - In this section, you will use polynomial identities to find prime numbers.
    - In this section, you will learn how to generate Pythagorean triples using a polynomial identity.
11. Polynomials Apply
12. Polynomials Review
13. Polynomials Unit Test

3. **Polynomial Functions & Graphs**
    1. Polynomial Functions & Graphs Introduction
    2. Roots of Polynomials
        - In this section, you will solve polynomial equations by decomposing polynomials into linear factors.
        - In this section, you will connect the zeros of a polynomial function to the x-intercepts on its graph.
    3. Repeating Roots
        - In this section, you will identify the multiplicities of linear factors of polynomial equations.
        - In this section, you will construct polynomial functions given the zeros and the multiplicity of each.
    4. Factoring Techniques
        - In this section, you will factor high-degree polynomials by decomposing them into quadratic factors.
        - In this section, you will factor high-degree polynomials by grouping.
        - In this section, you will factor high-degree polynomials by using their structures to identify patterns.
    5. Zeros of Polynomials

- In this section, you will describe the relationship between the degree of a polynomial and the number of zeros it has.
- In this section, you will use the zeros of a polynomial function to sketch its graph.

6. Relative Extrema of Polynomials
    - In this section, you will identify relative maximum and minimum values on a polynomial graph.
    - In this section, you will describe the relationship between the degree of a polynomial and the number of relative minima and maxima it has.
7. Graphs of Polynomials Portfolio
    - In this section, you will use the factored form of a polynomial function to find the zeros of its graph.
    - In this section, you will sketch the portions of a polynomial function's graph that exist between its zeros.
    - In this section, you will describe and sketch the end behavior of the graph of a polynomial function using its leading term.
8. Remainders
    - In this section, you will divide polynomials and represent the remainders.
    - In this section, you will apply the Remainder Theorem to evaluate polynomials.
    - In this section, you will apply the Factor Theorem to find factors of polynomial functions.
9. Modeling with Polynomials
    - In this section, you will represent polynomial relationships between two quantities.
    - In this section, you will interpret polynomial relationships between two quantities.
10. Polynomial Functions & Graphs Apply
11. Polynomial Functions & Graphs Review
12. Polynomial Functions & Graphs Unit Test

4. **Rational Expressions & Equations**
    1. Rational Expressions & Equations Introduction
    2. Rational Expressions
        - In this section, you will identify rational expressions.
        - In this section, you will create equivalent rational expressions.
        - In this section, you will compare rational expressions by writing them in different, equivalent forms.
    3. Multiplication & Division of Rational Expressions
        - In this section, you will multiply rational expressions.
        - In this section, you will divide rational expressions.
    4. Addition & Subtraction of Rational Expressions
        - In this section, you will add rational expressions.
        - In this section, you will subtract rational expressions with like and unlike denominators.
    5. Complex Algebraic Fractions
        - In this section, you will simplify complex algebraic fractions.
    6. Solving Rational Equations
        - In this section, you will solve rational equations by creating equivalent expressions.
        - In this section, you will solve rational equations by multiplying both sides by a common denominator.

- In this section, you will use models involving rational equations to solve real-world problems.

7. Solving Rational Equations Graphically
    - In this section, you will solve rational equations with real solutions containing factorable algebraic expressions algebraically and graphically.
8. Rational Expressions & Equations Apply
9. Rational Expressions & Equations Review
10. Rational Expressions & Equations Unit Test

5. **Complex Numbers**
    1. Complex Numbers Introduction
    2. No Real Solutions
        - In this section, you will characterize graphs and equations that have no real solutions.
        - In this section, you will characterize systems of equations and graphs that have no real solutions.
    3. The Existence of Imaginary Numbers
        - In this section, you will show that the set of imaginary numbers is a subset of the set of all numbers, separate from the set of real numbers.
        - In this section, you will re-express numbers containing the square root of negative numbers as complex numbers.
    4. The Complexity of Numbers
        - In this section, you will show that every number is a complex number composed of a real part and an imaginary part.
    5. The Complexity of Numbers Discussion
    6. Properties of Complex Numbers
        - In this section, you will show that the Commutative and Associative Properties hold for the set of complex numbers.
        - In this section, you will show that the Distributive Property holds for the set of complex numbers.
    7. Operations with Complex Numbers
        - In this section, you will use the properties of complex numbers to add complex numbers.
        - In this section, you will use the properties of complex numbers to subtract complex numbers.
        - In this section, you will use the properties of complex numbers to multiply complex numbers.
    8. Complex Numbers & Quadratic Equations
        - In this section, you will test quadratic equations to see that they have two solutions, though the solutions may involve imaginary or complex numbers.
        - In this section, you will estimate what the graph of a quadratic equation looks like based on the equation and its roots.
    9. Two Solutions for all Quadratic Equations
        - In this section, you will use the discriminant to determine the number of real solutions to a quadratic equation.
        - In this section, you will solve quadratic equations and express their solutions as complex numbers.
    10. Complex Numbers & Higher Order Polynomials
        - In this section, you will test solutions to polynomial equations to show they can have real solutions, complex solutions, or both.
        - In this section, you will show that if a complex number is a solution to a polynomial equation, its conjugate is also a solution.

- In this section, you will show that for every polynomial equation, real solutions correspond to x-intercepts, but complex solutions do not.

11. The Fundamental Theorem of Algebra
    - In this section, you will examine quadratic equations to learn how the Fundamental Theorem of Algebra applies to quadratic polynomials.
    - In this section, you will apply the Fundamental Theorem of Algebra given the degree of the polynomial to find the number of roots.
    - In this section, you will solve polynomial equations and justify their solutions using the Fundamental Theorem of Algebra.
12. Complex Numbers Apply
13. Complex Numbers Review
14. Complex Numbers Unit Test

6. **Equations & Inequalities**
    1. Equations & Inequalities Introduction
    2. Inverse & Joint Variation Portfolio
        - In this section, you will write inverse variation equations to model given datasets or practical situations.
        - In this section, you will write joint variation equations to model given datasets or practical situations.
        - In this section, you will solve a combination of direct and inverse variation problems.
    3. Quadratic Equations
        - In this section, you will use technology to create quadratic equations given a table of data.
        - In this section, you will solve quadratic equations algebraically using a variety of methods.
    4. Quadratic Inequalities
        - In this section, you will solve quadratic inequalities.
    5. Absolute Value Linear Equations
        - In this section, you will create absolute value linear equations from different representations of the function.
        - In this section, you will solve absolute value linear equations.
        - In this section, you will use technology to solve absolute value equations representing contextual situations.
    6. Absolute Value Linear Inequalities
        - In this section, you will create absolute value inequalities in one variable to model contextual situations.
        - In this section, you will solve absolute value linear inequalities in one variable algebraically.
        - In this section, you will use technology to solve absolute value inequalities representing contextual situations.
    7. Equations & Inequalities Apply
    8. Equations & Inequalities Review
    9. Equations & Inequalities Unit Test
7. **Systems of Equations**
    1. Systems of Equations Introduction
    2. Systems Containing Quadratic Equations
        - In this section, you will create systems of equations in two variables that combine a linear equation with a quadratic equation.
        - In this section, you will create systems of two quadratic equations in two variables.

        - In this section, you will determine the number of solutions to linear-quadratic and to quadratic-quadratic systems of equations by verifying solutions on a graphing utility.
    3. Solving Linear-Quadratic Systems of Equations
        - In this section, you will solve linear-quadratic systems of equations in two variables.
        - In this section, you will solve a linear-quadratic system of two equations in two variables by using graphs.
    4. Solving Quadratic-Quadratic Systems of Equations
        - In this section, you will solve systems of equations involving two quadratic equations in two variables using algebra.
        - In this section, you will solve systems of equations in two variables involving two quadratic equations using graphs.
    5. Analyzing Solutions to Systems of Equations
        - In this section, you will solve systems of equations and verify them using a graphing utility.
    6. Systems of Equations Apply
    7. Systems of Equations Review
    8. Systems of Equations Unit Test
8. Exponents & Radicals
    1. Exponents & Radicals Introduction
    2. Revisiting Exponents & Their Functions
        - In this section, you will use the laws of exponents to solve algebraic equations containing integer exponents.
        - In this section, you will use the laws of exponents to solve algebraic equations containing rational exponents and roots.
        - In this section, you will model situations involving exponential growth and decay.
    3. Radical Expressions
        - In this section, you will rewrite algebraic expressions containing radicals in equivalent forms.
        - In this section, you will add and subtract rational exponents and roots within expressions.
        - In this section, you will multiply and divide rational exponents and roots within expressions.
    4. Radical Equations
        - In this section, you will solve radical equations with variables on one side.
        - In this lesson, you will solve radical equations with variables on both sides.
        - In this section, you will verify the solutions of radical equations using a graphing utility.
    5. Radical Equations & Models
        - In this section, you will use models that involve radical equations with no more than one radical expression to solve real-world problems algebraically.
        - In this section, you will use models that involve radical equations with no more than one radical expression to solve real-world problems using a graphing utility.
    6. Irrational Exponents
        - In this section, you will estimate quantities involving positive rational exponents.
        - In this lesson, you will use sequences to closely approximate quantities with irrational exponents.

7. Euler's Number, e
    - In this section, you will discover Euler's number e, and examine the application of e in a variety of mathematical situations.
    - In this section, you will apply Euler's number (e) in a variety of situations.
8. Exponents & Radicals Apply
9. Exponents & Radicals Review
10. Exponents & Radicals Unit Test

9. **Algebra 2 A Semester Review & Exam**
    1. Algebra 2 A Semester Review
    2. Algebra 2 A Semester Exam

Semester B Summary:

In this course, students will learn, practice, and apply skills and strategies that will help them grow into strong mathematical thinkers. The course presents math as a complete subject to be studied, not merely sets of rules and formulas to be followed. Arriving at solutions is important, as are precision and vocabulary, but instruction does not center on procedural math only. Instead, instruction encourages depth of understanding, connections within and outside courses, flexibility of approaches, and usage of various tools. Daily instruction supports student learning of core algebraic concepts and development of procedural fluency regarding exponents and radicals; logarithms; inverses; exponential and logarithmic functions; finite geometric series; storytelling with functions; and probability and statistics. Each instructional learning object is aligned to and framed by one of eight Standards for Mathematical Practice. Students are encouraged to use visual representations of their thinking to bridge their understanding between the concrete and abstract, allowing patterns and geometric principles to come to life. In peer model videos throughout the course, the learner's peers demonstrate apply targeted mathematical skills, often using real-world examples. Instruction in 21st century skills further illustrates connections between mathematical concepts and real-world situations to support students' development of the abilities, knowledge, and expertise they need to thrive in today's world. Mathematical discussion prompts encourage students to revise misconceptions, uncover nuances in application, make connections to prior knowledge, identify patterns, and engage with vocabulary. Students are encouraged to share their thinking, justify their own solutions, read critically, and constructively critique the reasoning of others. The course is designed to support a growth mindset regarding math and encourages students to engage in productive struggle; instructional materials implicitly and explicitly remind students that mistakes are opportunities for learning and acquiring new skills. Together the course elements ensure the student grows as a mathematical thinker and develops the tools necessary for success at work and in life.

Semester B Outline

1. **Algebra 2 B Course Overview**
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2. **Square Root & Cube Root Functions**
    1. Square Root & Cube Root Functions Introduction
    2. Graphing the Square Root Function
        - In this section, you will graph the square root function $f(x) = \sqrt{x}$.
        - In this section, you will identify the key attributes of the square root function.
        - In this section, you will write the domain and range of a square root function in various forms.
    3. Shifting the Square Root Function

- In this section, you will analyze the effect on the graph of $f(x) = \sqrt{x}$ when $f(x)$ is replaced with $f(x) + d$.
- In this section, you will analyze the effect on the graph of $f(x) = \sqrt{x}$ when $f(x)$ is replaced by $f(x - c)$.

4. Scaling the Square Root Function
   - In this section, you will analyze the effect on the graph of $f(x) = \sqrt{x}$ when $f(x)$ is replaced by $af(x)$ for positive values of a.
   - In this section, you will analyze the effect on the graph of $f(x) = \sqrt{x}$ when $f(x)$ is replaced by $f(bx)$ for positive values of b.
5. Reflecting the Square Root Function
   - In this section, you will analyze the effects on the graph of $f(x) = \sqrt{x}$ when $f(x)$ is replaced by $af(x)$ for negative values of a.
   - In this section, you will analyze the effects on the graph of $f(x) = \sqrt{x}$ when $f(x)$ is replaced by $f(bx)$ for negative values of b.
6. Graphing the Cube Root Function
   - In this section, you will graph the cube root function $f(x) = \sqrt[3]{x}$.
   - In this section, you will identify the key attributes of the cube root function.
   - In this section, you will write the domain and range of the cube root function using interval notation, inequality notation, and set notation.
7. Shifting the Cube Root Function
   - In this section, you will analyze the effect on the graph of $f(x) = \sqrt[3]{x}$ when $f(x)$ is replaced with $f(x) + d$.
   - In this section, you will analyze the effect on the graph of $f(x) = \sqrt[3]{x}$ when $f(x)$ is replaced by $f(x - c)$.
8. Scaling the Cube Root Function
   - In this section, you will analyze the effect on the graph of $f(x) = \sqrt[3]{x}$ when $f(x)$ is replaced by $af(x)$, where a is a positive real number.
   - In this section, you will analyze the effect on the graph of $f(x) = \sqrt[3]{x}$ when the argument, x, is replaced by bx, where b is a positive real number.
9. Reflecting the Cube Root Function
   - In this section, you will analyze the effects on the graph of $f(x) = \sqrt[3]{x}$ when $f(x)$ is replaced by $af(x)$, where a is a negative real number.
   - In this section, you will analyze the effects on the graph of $f(x) = \sqrt[3]{x}$ when $f(x)$ is replaced by $f(bx)$, where b is a negative real number.
10. Square Root & Cube Root Functions Apply
11. Square Root & Cube Root Functions Review
12. Square Root & Cube Root Functions Unit Test

3. **Rational Functions**
   1. Rational Functions Introduction
   2. Graphing the Reciprocal Function
      - In this section, you will graph the reciprocal function $f(x) = \frac{1}{x}$.
      - In this section, you will identify the key attributes of the reciprocal function.
      - In this section, you will write the domain and range of the reciprocal function in interval notation, as inequalities, and in set notation.
   3. Shifting the Reciprocal Function
      - In this section, you will analyze the effect on the graph of the reciprocal function when a number is added to or subtracted from the function.
      - In this section, you will analyze the effect on the graph of the reciprocal function when a number is added or subtracted within the function.
   4. Scaling the Reciprocal Function

- In this section, you will analyze the effect on the graph of $f(x) = \frac{1}{x}$ when $f(x)$ is replaced by $af(x)$ for positive values of a.
- In this section, you will analyze the effect on the graph of $f(x) = \frac{1}{x}$ when $f(x)$ is replaced by $f(bx)$ for positive values of b.

5. Reflecting the Reciprocal Function
    - In this section, you will analyze the effects on the graph of $f(x) = \frac{1}{x}$ when $f(x)$ is replaced by $af(x)$ for negative values of a.
    - In this section, you will analyze the effects on the graph of $f(x) = \frac{1}{x}$ when $f(x)$ is replaced by $f(bx)$ for negative values of b.
6. Rational Functions Apply
7. Rational Functions Review
8. Rational Functions Unit Test

4. **Inverses**
    1. Inverses Introduction
    2. Inverses Represented Graphically
        - In this section, you will show that inverses are graphs reflected over the line $y = x$.
        - In this section, you will determine whether two graphs are inverses of each other.
        - In this section, you will create the inverse of a given graph.
    3. Inverses Represented Numerically
        - In this section, you will show numerically that $y = x$ means the domain of a relation becomes the range and vice versa.
        - In this section, you will determine whether two relations are inverses of each other based on their domains and ranges.
        - In this section, given a table that represents a relation, you will create its inverse.
    4. Inverses Represented Verbally
        - In this section, you will show verbally that $y = x$ means to create a description of a relation in terms of the dependent variable.
        - In this section, you will determine whether two relations are inverses of each other by their descriptions.
        - In this section, you will create an inverse given a scenario representing a relation.
    5. Inverses Represented Algebraically
        - In this section, you will show algebraically that $y = x$ means to create the equation of the inverse by switching the variables and solving for y.
        - In this section, you will determine whether two functions are inverses of each other by function composition.
        - In this section, you will identify the inverse of a function.
    6. Inverses and Functions
        - In this section, you will show that all relations have inverses, but not all inverses are functions.
        - In this section, you will identify one-to-one functions in different representations.
    7. Inverses Apply
    8. Inverses Review
    9. Inverses Unit Test

5. **Exponential & Logarithmic Functions**
    1. Exponential & Logarithmic Functions Introduction

2. The Need for Logarithms
    - In this section, you will solve exponential equations with variable exponents using tables of over and under estimates.
    - In this section, you will rewrite exponential expressions as logarithms and logarithms as exponential expressions.
    - In this section, you will explore which numbers can be used as a logarithmic base and which numbers for which you can find the logarithms.
3. The Exponent-Logarithm Relationship
    - In this section, you will use the properties of exponents to prove $log1 = 0$ and $log10 = 1$ and generalize to find that $log(10^m) = m$.
    - In this section, you will use the relationship between exponents and logarithms to prove $10^{\log x} = x$.
    - In this section, you will use the properties $log1 = 0$, $log10 = 1$, $log(10^m) = m$, and $10^{\log x} = x$ to evaluate logarithms.
4. Locating Irrational Numbers
    - In this section, you will locate irrational numbers on a number line by squeezing them into increasingly smaller intervals.
    - In this section, you will perform operations on irrational numbers by making increasingly smaller rational approximations.
5. Graphing Logarithmic Functions
    - In this section, you will graph logarithmic functions with different bases.
    - In this section, you will identify key features of a logarithmic function.
    - In this section, you will compare the key features of logarithmic functions with different bases.
6. Corresponding Exponential & Logarithmic Functions
    - In this section, you will compare the key features of an exponential function to that of its corresponding logarithmic function.
    - In this section, you will describe the geometric relationship between the graph of an exponential function and its corresponding logarithmic function.
    - In this section, you will establish that the functions $f(x) = log_b x$ and $g(x) = b^x$ are inverses of each other.
7. General Form of an Exponential Function
    - In this section, you will identify the transformations in the functions of the form $f(x) = ab^{(x-h)}+k$.
    - In this section, you will use transformations to graph exponential functions of the form $f(x) = a(b)^{x-h}+k$.
    - In this section, you will use the properties of exponents to rewrite functions of the form $f(x) = a(b)^{x-h}+k$ that can be graphed using transformations.
8. General Form of a Logarithmic Function
    - In this section, you will identify transformations of logarithmic functions in the form of $f(x) = alog_b(x-h)+k$.
    - In this section, you will use transformations to graph functions of the form $f(x) = alog_b(x-h)+k$.
    - In this section, you will use the properties of logarithms to rewrite functions of the $f(x) = alog_b(x-h)+k$ that can be graphed using transformations.
9. Solving Exponential Equations
    - In this section, you will solve exponential equations using the properties of logarithms and the inverse relationship between exponential and logarithmic functions.
    - In this section, you will solve exponential equations by locating the point of intersection on a graph of two exponential functions or an exponential and a

linear function.
10. Exponential & Logarithmic Functions Apply
11. Exponential & Logarithmic Functions Review
12. Exponential & Logarithmic Functions Unit Test

6. **Investigating Functions**
    1. Investigating Functions Introduction
    2. Parent Functions
        - In this section, you will recognize the general shape of function families using a graphing utility.
    3. Vertical & Horizontal Asymptotes
        - In this section, you will determine the equations of vertical and horizontal asymptotes of rational functions.
        - In this section, you will determine the equations of vertical and horizontal asymptotes of logarithmic functions.
        - In this section, you will determine the equations of horizontal asymptotes of exponential functions.
    4. Continuity
        - In this section, you will describe various functions as continuous or discontinuous.
        - In this section, you will determine where the discontinuity of functions occurs.
        - In this section, you will identify the domain, range, zeros, and intercepts of graphs containing discontinuities.
    5. Comparing Representations of Functions
        - In this section, you will compare the graphs of rational, exponential, and logarithmic functions.
        - In this section, you will compare tables of rational, exponential, and logarithmic functions.
        - In this section, you will compare equations of rational, exponential, and logarithmic functions.
    6. Comparing Representations of Functions Discussion
    7. Comparing Characteristics of Functions
        - In this section, you will contrast key characteristics of square root and cube root functions.
        - In this section, you will use technology to represent square root and cube root functions.
        - In this section, you will contrast key characteristics of functions.
    8. Composition of Functions
        - In this section, given a description of a scenario involving two functions, you will determine the composition of the two functions algebraically.
        - In this section, given a description of a scenario involving two functions, you will determine the composition of the two functions graphically.
    9. Investigating Functions Apply
    10. Investigating Functions Review
    11. Investigating Functions Unit Test
7. **Storytelling with Functions**
    1. Storytelling with Functions Introduction
    2. The Library of Functions
        - In this section, you will relate the shapes of parent functions to their equations and descriptions.
        - In this section, you will analyze the key features of a variety of functions.

- In this section, you will compare parent functions that have similar behaviors.

3. Choosing Models
    - In this section, you will determine the type of function that best models a given sequence of data in context.
    - In this section, you will determine the type of function that best models a description of a scenario.
4. Interpreting Models
    - In this section, you will interpret the key features of a function that models a situation in terms of the quantities that are represented.
    - In this section, you will sketch a graph that highlights the key features of the function in terms of the quantities represented given the description of a situation.
    - In this section, you will relate the domain of a function to the situation it describes.
5. Average Rate of Change
    - In this section, you will estimate average rates of change in context when given a function, or its graph, that models a situation.
    - In this section, you will calculate average rates of change given a function that models a situation.
    - In this section, you will interpret average rates of change in the context of a given situation.
6. Comparing & Creating Models
    - In this section, you will compare features of two function models represented in different ways in context.
    - In this section, you will use a variety of techniques to develop an appropriate model given a scenario.
7. Intersecting Models
    - In this section, you will create an equation to find the intersection of two functions given a scenario.
    - In this section, you will graph a pair of functions from a given situation in a coordinate plane in order to determine where they intersect.
    - In this section, you will interpret the meaning of solutions to an equation in the form $f(x) = g(x)$.
8. Combining Models
    - In this section, you will build functions to represent models combining functions of different types.
    - In this section, you will build functions and create models to represent scenarios combining functions of different types.
9. Storytelling with Functions Apply
10. Storytelling with Functions Review
11. Storytelling with Functions Portfolio

8. **Probability & Statistics**
    1. Probability & Statistics Introduction
    2. Permutations & Combinations
        - In this section, you will calculate the number of permutations of n objects taken r at a time.
        - In this section, you will calculate the number of combinations of n objects taken r at a time.
        - In this section, you will compare and contrast permutations and combinations.

3. Practical Permutations & Combinations
    - In this section, you will use permutations and combinations as counting techniques to solve practical problems.
    - In this section, you will calculate and verify permutations and combinations using a graphing utility.
4. Observational Studies
    - In this section, you will define random selection and explain its importance in observational studies.
    - In this section, you will describe the types of statistical questions that are best answered by observational studies.
5. Surveys
    - In this section, you will describe statistical questions that would best be answered by surveys.
    - In this section, you will explain why random selection is necessary when conducting surveys.
6. Experiments
    - In this section, you will identify and describe statistical questions that can best be answered using experiments to gather data.
    - In this section, you will explain the importance of random assignment when using experiments.
7. Collecting Quantitative Univariate Data Portfolio
    - In this section, you will conduct a survey to collect quantitative univariate data.
8. Shape, Center, and Spread
    - In this lesson, you will distinguish between symmetric and skewed distributions.
    - In this section, you will interpret the mean as a typical value of a distribution and the standard deviation as a typical distance a value is from the mean.
    - In this section, you will discuss estimates of the mean and standard deviation, and their reasonableness, for symmetric and skewed distributions.
9. Shape, Center, and Spread Discussion
10. The Normal Curve
    - In this section, you will use a smooth curve to model a data distribution.
    - In this section, you will learn about the attributes of a normal curve and how to use them to describe different probability distributions.
    - In this section, you will recognize when it is reasonable to use a normal curve as a model for a distribution.
11. Area Under a Normal Curve
    - In this section, you will calculate z-scores.
    - In this section, you will use z-scores to estimate the area under a normal curve.
    - In this section, you will use the area under normal curves to calculate probabilities of events.
12. Modeling with Normal Distributions
    - In this section, you will use technology to estimate the area under a normal curve.
    - In this section, you will model data distributions with appropriate normal distributions.
13. Graphing & Data
    - In this section, you will use a graphing tool to determine an equation of the curve of best fit given a set of no more than 20 data points in a table or

graph.
    - In this section, you will use a graphing tool to determine an equation of the curve of best fit, given a set of no more than 20 data points in a practical situation.
14. Predictions and Practical Problems
    - In this section, you will make predictions using data, scatterplots, or the equation of the curve of best fit.
    - In this section, you will solve practical problems involving an equation of the curve of best fit.
15. Probability & Statistics Apply
16. Probability & Statistics Review
17. Probability & Statistics Unit Test

9. **Algebra 2 B Semester Review and Exam**
    1. Algebra 2 B Semester Review
    2. Algebra 2 B Semester Exam