Algebra 2 Unit 1: Sequences and Linear Functions

Lesson	Learning Targets
1.1 Recursive Sequences	• Use a recursive formula to generate terms of a sequence and vice versa. • Identify the common difference or common ratio for a sequence. • Identify whether a sequence is arithmetic, geometric or neither.
1.2 Applications of Arithmetic Sequences	• Write explicit formulas for arithmetic sequences. • Graph and describe arithmetic sequences. • Decide if an arithmetic sequence is appropriate for a scenario presented as a graph, table, formula or in words.
1.3 Sum of an Arithmetic Sequence	• Find the sum of an arithmetic sequence with a set number of terms. • Interpret summation notation and calculate the sum.
1.4 Applications of Geometric Sequences	• Describe and graph geometric sequences. • Write a recursive formula for a geometric sequence. • Write an explicit formula for a geometric sequence.
1.5 Linear Relationships	• Write and graph linear equations in slope intercept form ($y= ax+b$). • Interpret slope and y-intercept in context. • Understand properties of horizontal and vertical lines.
1.6 Point-Slope Form of a Line	• Write and graph linear equations in point slope form. • Make connections between finding terms of an arithmetic sequence and outputs of a linear equation.
1.7 Standard Form of a Linear Equation	• Write and graph linear equations in standard form ($Ax+By=C$). • Identify and interpret the slope of a line written in standard form. • Identify and interpret x- and y-intercepts of a line written in standard form.

Ma+h Medic

Algebra 2 Unit 2: Linear Systems

Lesson	Learning Targets
2.1 Linear Systems	• Find solutions to a linear equation by graphing. • Find solutions to a linear system by graphing. • Solve linear systems using substitution.
2.2 Number of Solutions	• Determine if a system has 1 solution, no solution, or infinite solutions. • Identify the features that make a system consistent or inconsistent.
2.3 Elimination	• Solve linear systems using elimination. • Use elimination strategies to determine if a system has 0, 1, or infinite solutions.
2.4 Larger Systems of Equations	• Solve systems of equations with more than 2 variables.
2.5 Systems of Inequalities	• Graph systems of linear inequalities. • Find solutions for systems of linear inequalities.
2.6 Optimization Using Systems of Inequalities	• Find the maximum or minimum of an objective function given linear constraints.

Math Medic

Algebra 2 Unit 3: Function Families and Transformations

Lesson	Learning Targets
3.1 Interpreting Graphs	• Identify the independent and dependent variables for a model. • Create graphs to model situations.
3.2 What is a Function?	• Identify the domain and range of a relation. • Determine if a relation is a function. • Use function notation when writing and evaluating functions.
3.3 Translating Functions	• Translate the graph of a function using $y = k + f(x - h)$ • Write and simplify the translated equation of a function.
3.4 Quadratic Functions and Translations	• Understand how the shape of a quadratic graph determines the domain, range and number of solutions. • Determine the domain and range of a quadratic function. • Identify the vertex and axis of symmetry of a transformed quadratic function. • Write equations of transformed quadratic functions.
3.5 Square Root Functions and Reflections	• Graph square root functions and determine the domain and range. • Reflect a function over the *x*-axis and explain the effects on its equation and graph. • Reflect a function over the *y*-axis and explain the effects on its equation and graph.
3.6 Absolute Value Functions and Dilations	• Graph absolute value functions and determine the domain and range. • Connect algebraic and graphical representations of vertical and horizontal dilations. • Write equations of transformed functions.
3.7 Equations of Circles	• Graph circles in the form $x^2 + y^2 = r^2$ • Find the center and radius of a circle from an equation. • Write an equation for a circle from a description or graph.

Ma+h Medic

Algebra 2 Unit 4: Working with Functions

Lesson	Learning Targets
4.1 Using Multiple Strategies to Solve Equations	• Use graphs, tables, and algebraic methods to find solutions to an equation or to approximate a solution to an equation. • Connect the meaning of a solution across multiple representations.
4.2 Solving Equations	• Solve linear, quadratic, square root and absolute value equations using algebraic manipulation. • Solve linear, quadratic, square root and absolute value equations by graphing.
4.3 Solving Nonlinear systems	• Solve systems of equations with two different function types graphically. • Solve systems of equations with two different function types using elimination or substitution.
4.4 Combining Functions	• Combine functions and constants to create new functions using addition, subtraction, multiplication and division. • Evaluate combinations of functions for given input values.
4.5 Composition of Functions	• Given two functions, compose new functions by inputting one into the other. • Evaluate a composition of functions for given input values.
4.6 Inverse Relationships	• Given a function, write the inverse function using function notation. • Determine if two functions are inverses algebraically using composition of functions.
4.7 Graphs of Inverses	• Graph the inverse of a function and describe its relationship to the original function. • Determine the domain and range of an inverse function and describe its relationship to the original function. • Determine if a function is invertible.

Ma+h Medic

Algebra 2 Unit 5: Exponential Functions and Logarithms

Lesson	Learning Targets
5.1 Equations of Exponential Functions	• Write an exponential equation for a geometric sequence. • Determine if a relationship describes a linear or exponential function • Write exponential functions from a table, graph or description.
5.2 Graphs of Exponential Functions	• Graph exponential functions and identify the y-intercept and asymptote. • Identify the domain and range of an exponential function. • Identify if a function is modeling growth or decay. • Write equations for transformed exponential equations.
5.3 Applications of Exponential Functions	• Write and apply exponential growth and decay functions using a percent rate of change. • Create and apply a formula for annual compound interest.
5.4 Building Exponential Models	• Create exponential models to fit a data set using the *y*-intercept and an approximated percent rate of change. • When given two points, write an exponential model to fit them. • From a given scenario, create an exponential function to model the description.
5.5 Logarithms	• Explain how the input and output of a logarithm describe an exponential relationship. • Rewrite exponential equations as logarithmic equations and vice versa. • Evaluate logarithmic expressions. • Use exponents and logarithms to solve equations.
5.6 Graphs of Logarithmic Functions	• Graph logarithmic functions and identify the y-intercept and asymptote. • Identify the domain and range of a logarithmic function. • Describe a logarithmic function as an inverse function of an exponential function.

Math Medic

Algebra 2 Unit 6: Quadratic Functions

Lesson	Learning Targets
6.1 Forms of Quadratic Equations	• Write and graph quadratic functions in vertex, intercept and general forms. • Find the vertex and axis of symmetry from the equation of a quadratic. • Identify the *x*-intercepts of a quadratic written in intercept form. • Rewrite an equation from vertex or intercept form to general form.
6.2 Writing Equations for Quadratic Functions	• Write an equation for a quadratic from a graph, table or description. • Use the symmetry of a quadratic to find values of the function.
6.3 Factoring Quadratics. Part 1.	• Multiply polynomial factors using distribution or rectangle diagrams. • Factor quadratic equations in the form of $ax^2 + bx + c$ when $a = 1$.
6.3 Factoring Quadratics. Part 2.	• Factor quadratic equations in the form of $ax^2 + bx + c$ when $a > 1$.
6.4 Solving using the Zero Product Property	• Understand why setting a quadratic equal to 0 allows solving because of the Zero Product Property. • Solve quadratic equations written in factored form. • Connect solving quadratics in factored form with graphing a quadratic and finding the *x*-intercepts.
6.5 Completing the Square	• Rewrite quadratic equations as perfect squares. • Solve quadratic equations by completing the square.
6.6 Completing the Square for Circles	• Given an expanded equation of a circle, rewrite the equation to find the center and radius of a circle.

Ma+h Medic

6.7 Quadratic Formula	• Solve quadratic equations with real solutions using the quadratic formula.
6.8 Complex Numbers	• Understand what the imaginary number is, why it is needed, and how to simplify expressions using it. • Simplify square roots of negative numbers using *i*. • Solve quadratic equations with imaginary solutions and identify conjugate pairs.
6.9 The Discriminant and Types of Solutions	• Solve quadratic equations with nonreal solutions using the quadratic formula. • Use the discriminant to determine the type and number of solutions an equation will have. • Use the graph of a quadratic to determine the number and type of solutions.

Math Medic

Algebra 2 Unit 7: Higher Degree Functions

Lesson	Learning Targets
7.1 What is a Polynomial?	• Determine if an expression is a polynomial and if so, identify the degree. • Write polynomials in general form. • Use common differences of output values to find the degree of a polynomial.
7.2 Forms of Polynomials	• Find the x- and y- intercepts of a polynomial written in factored form. • Find the y-intercept of a polynomial written in general form. • Use the x-intercepts of a polynomial to write an equation for the polynomial.
7.3 Polynomial Function Behavior	• Given a polynomial, determine the maximum number of x-intercepts and turns. • Describe the end behavior of a polynomial based on the leading coefficient and the degree of the polynomial.
7.4 Repeating Zeros	• Use the degree of a factor to determine if the graph will touch or cross at the associated x-intercept. • Given a polynomial written in factored form, identify all x-intercepts including their multiplicity. • Find the zeros of a polynomial by graphing, factoring, or using conjugate pairs.
7.5 Multiplying and Dividing Polynomials	• Multiply polynomials of any degree and simplify the product. • Divide polynomials using a rectangle diagram. • Determine if a polynomial divides another polynomial evenly.
7.6 Factoring Polynomials	• Determine if an expression is a factor of a polynomial through division. • Given a factor of a polynomial, find all remaining factors through division. • Factor a polynomial completely.

Ma+h Medic

| 7.7 Solving Polynomials | • Given an equation of a polynomial, use a table or graph to find initial zeros, then find remaining zeros. |
| | • Find all roots of a polynomial. |

Math Medic

Algebra 2 Unit 8: Rational Functions

Lesson	Learning Targets
8.1 Intro to Rational Functions	• Write and evaluate rational functions. • Interpret horizontal asymptotes in a real-world context.
8.2 Graphs of Rational Functions	• Describe how a function in the form of $y = \frac{a}{(x-h)} + k$ has been transformed from the parent function of $y = \frac{1}{x}$. • Identify key aspects of the graphs of rational functions in the form of $y = \frac{a}{(x-h)} + k$. • Identify the domain and range of rational functions in the form of $y = \frac{a}{(x-h)} + k$.
8.3 Key Features of Graphs of Rational Functions	• Find the x-intercepts of a rational function by finding the zeros of the numerator. • Find the vertical asymptotes of a rational function by finding the zeros of the denominator. • Identify holes in the graph of a rational function.
8.4 Adding and Subtracting Rational Functions	• Simplify rational functions to lowest terms. • Add and subtract rational functions.
8.5 Multiplying and Dividing Rational Functions	• Multiply and divide rational functions.
8.6 Solving Rational Functions	• Solve equations with rational functions using a variety of methods. • Identify extraneous solutions.

Ma+h Medic

Algebra 2 Unit 9: Trigonometry

Lesson	Learning Targets
9.1 Right Triangle Trigonometry	• Explain how angles determine the ratio of side lengths. • Find and use trigonometric ratios with a right triangle. • Find missing sides and angles in a right triangle.
9.2 Solving for Missing Sides Using Trig Ratios	• Write and solve trigonometric equations. • Use trigonometric functions to solve for missing sides of a right triangle.
9.3 Inverse Trig Functions for Missing Angles	• Use similar triangles to find missing angle measures. • Use inverse trigonometric functions to solve for missing angles in right triangles.
9.4 Special Right Triangles	• Use properties of 30-60-90 triangles to find side lengths. • Use properties of 45-45-90 triangles to find side lengths.
9.5 Angles on the Coordinate Plane	• Draw angles in standard position on the coordinate plane with both positive and negative angle measures. • Find coterminal angles for a given angle. • Calculate reference angles for angles in standard position. • Calculate trigonometric ratios for angles in standard position.
9.6 The Unit Circle	• Use special right triangles to find coordinates on a unit circle. • Understand that on a unit circle, cos=x coordinate and sin=y coordinate. • Evaluate sin, cos, tan functions using the unit circle.
9.7 Radians	• Explain how a radian represents the length of an arc length in radii for an angle. • Convert angles from degrees to radians and vice versa.

Math Medic

9.8 Radians and the Unit Circle	- Label angles on the coordinate plane in radians. - Label common angles on the unit circle in radians. - Find reference angles on the unit circle in radians and degrees.
9.9 Arc Length and Area of a Sector	- Calculate the arc length of a sector when given an angle and radius. - Calculate the area of a sector when given an angle and radius.

Ma**t**h Medic