WAKE COUNTY
PUBLIC SCHOOL SYSTEM

Math I UNIT 1 OVERVIEW: Introduction to Functions and Equations

Unit Outcomes	Where This Unit Fits
At the end of this unit, your student should be able to:	Connections to prior and future learning

Unit Outcomes	Where This Unit Fits
- Use mathematical properties to justify a chosen solution method and each step in the process of solving an equation or inequality algebraically. - Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and combining like terms. - Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. - Determine how many solutions an equation has by successively transforming the equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers). - Use function notation to evaluate a given value in the domain. - Construct models of functions using graphs, equations, and tables. - Interpret the meaning of the independent and dependent variables in context. - Determine if a relation is a function and justify my answer based on the definition of a function. - Evaluate functions given inputs of their domains. - Interpret statements that use function notation in terms of their context. - Interpret the key features of a function, including where the function is increasing and decreasing (positive and negative) when given the function as a table, graph, and/or verbal description. - Sketch the graph of the function showing key features given a verbal description of a relationship between two quantities. - Describe the real world meaning of the domain and range of a function. - State the domain and range of a function from its graph. - Calculate and interpret the average rate of change of a function over a specified interval given a table, graph, or verbal description. . - Generate a recursive sequence given the first term and the recursive rule. - Determine the recursive and explicit formulas given a sequence. - Evaluate an explicit sequence for any number of terms.	**Coming into this unit, students should have a strong foundation in:** - Basic arithmetic involving rational numbers - Writing simple equations and expressions - Solving 2 step equations and inequalities - Creating 1 or 2 step equations from a context - Operations with integers - Solving 1 variable equations **This unit builds to the following future skills and concepts:** - Solving 2 variable equations and inequalities - Describing the domain and range of quadratic functions - Writing and solving quadratic and exponential equations - Solving and justifying the solution process for quadratic, & exponential equations

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Key Standards Addressed Connections to Common Core/NC Essential Standards	Key Vocabulary Terms to deepen the student's understanding	
8.EE.7 Solve equations with one variable using rational numbers (may have one solution, infinite solutions, or no solution) **8.F.1** Understand that a function is a rule that assigns to each input exactly one output. **8.F.5** Describe qualitatively the functional relationship between two quantities by analyzing a graph. **NC.M1.A-CED.1** Create equations and inequalities in one variable that represent **linear**, exponential, and quadratic relationships and use them to solve problems. **NC.M1.A.CED.4** Solve for a quantity of interest in formulas used in science and mathematics using the same reasoning as in solving equations. **NC.M1.A-REI.1** Justify a chosen solution method and each step of the solving process for **linear** and quadratic equations using mathematical reasoning. **NC.M1.A-REI.3** Solve linear equations and inequalities in one variable. **NC.M1.F-IF.1** Build an understanding that a function from one set (called the domain) to another set (called the range) assigns to each el element of the domain exactly one element of the range by recognizing that: • if f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. • the graph of f is the graph of the equation $y = f(x)$. **NC.M1.F-IF.2** Use function notation to evaluate **linear**, quadratic, and exponential functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	Addition Property of Equality Additive Identity Property of Zero Algebraic Expression Additive Inverse Coefficient Constant Continuous Decreasing Dependent Variable Discrete Distributive Property Division Property of Equality Domain Equation Equivalent Expression Evaluate Explicit Equation Expression Function Function Notation Function Rule Function Table Increasing Independent Variable Inequality Infinitely Many Solutions Initial Value Input Integer Inverse Operations Irrational Number Iteration	Like Term Linear Association Linear Function Linear Inequality Linear Relationship Mapping Diagram Multiplication Property of Equality No solution Non-linear Association Non-linear Function NOW-NEXT formula Order of Operations Output Output Proportional Relationship Range Rate of Change Recursive Equation Relation Sequence Simplify Solution Substitute Subtraction Property of Equality Term Variable Vertical Line Test X-value Y-value

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NC.M1.F-IF.3 Recognize that recursively and explicitly defined sequences are functions whose domain is a subset of the integers, the terms of an arithmetic sequence are a subset of the range of a linear function, and the terms of a geometric sequence are a subset of the range of an exponential function.

NC.M1.F-IF.4 Interpret key features of graphs, tables, and verbal descriptions in context to describe functions that arise in applications relating two quantities, including: intercepts; intervals where the function is increasing, decreasing, positive, or negative; and maximums and minimums.

NC.M1.F-IF.5 Interpret a function in terms of the context by relating its domain and range to its graph and, where applicable, to the quantitative relationship it describes.

NC.M1.F-IF.6 Calculate and interpret the average rate of change over a specified interval for a function presented numerically, graphically, and/or symbolically.

Additional Resources Materials to support understanding and enrichment	**"Learning Checks"** Questions Parents Can Use to Assess Understanding
- Teaching videos made by Wake County teachers - WCPSS YouTube Channel – Math Playlist - Linear Equations - Solving Linear Equations - Linear Inequalities - Solving Equations with Variables on Both Sides - Identities and No Solutions - Solving Equations with Variables on Both Sides - Identity and No Solution Equations - Rate of change/slope overview (video) - Finding rate of change from a graph (practice) - Domain and range overview (video) - Finding domain and range (practice) - Determining if a relation is a function (practice) - Determining if a graph is a function (practice) - Rate of change (formative assessment)	- Why is it helpful to write numbers in different formats? - When is it appropriate to create and use an equation versus an inequality to model a given situation and/or solve a given problem? - In what scenarios can algebraic functions be utilized to solve problems in your life? - How can the relationship between two quantities be described or represented? - Where in the real world can we find functions that can be modeled? - How are the key features identified, described, and interpreted from different representations of functions? - Why are algebraic concepts important in math and science?

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Please note, the unit guides are a work in progress. If you have feedback or suggestions on improvement, please feel free to contact wakemiddle@wcpss.net.