

Math I UNIT 1 OVERVIEW: Introduction to Functions and Equations

Unit Outcomes	Where This Unit Fits
<p>At the end of this unit, your student should be able to:</p> <ul style="list-style-type: none"> ● 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. 	<p style="text-align: center;">Connections to prior and future learning</p> <p>Coming into this unit, students should have a strong foundation in:</p> <ul style="list-style-type: none"> ● 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 <p>This unit builds to the following future skills and concepts:</p> <ul style="list-style-type: none"> ● 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	
<p>8.EE.7 Solve equations with one variable using rational numbers (may have one solution, infinite solutions, or no solution)</p> <p>8.F.1 Understand that a function is a rule that assigns to each input exactly one output.</p> <p>8.F.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph.</p> <p>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.</p> <p>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.</p> <p>NC.M1.A-REL.1 Justify a chosen solution method and each step of the solving process for linear and quadratic equations using mathematical reasoning.</p> <p>NC.M1.A-REL.3 Solve linear equations and inequalities in one variable.</p> <p>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 element of the domain exactly one element of the range by recognizing that:</p> <ul style="list-style-type: none"> • 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 $y = f(x)$. <p>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.</p>	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 • Order of Operations • Output • 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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<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>		
<p style="text-align: center;">Additional Resources</p> <p>Materials to support understanding and enrichment</p>	<p style="text-align: center;">“Learning Checks”</p> <p>Questions Parents Can Use to Assess Understanding</p>	
<ul style="list-style-type: none"> • Teaching videos made by Wake County teachers • 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) 	<ul style="list-style-type: none"> • 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.