

Richmond Public Schools
Curriculum Framework
Algebra, Functions, and Data Analysis

Strand: Algebra Functions	
AFDA.2 The student will use knowledge of transformations to write an equation, given the graph of a linear, quadratic, exponential, and logarithmic function.	
Suggested Pacing	
9 Class Periods	
Spiraling Standards	
<p>A.7-The student will investigate and analyze linear and quadratic function families and their characteristics both algebraically and graphically, including</p> <p style="padding-left: 40px;">f) connections between and among multiple representations of functions using verbal descriptions, tables, equations, and graphs</p> <p>All.6-For absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic functions, the student will</p> <p>a) recognize the general shape of function families; and</p> <p>b) use knowledge of transformations to convert between equations and the corresponding graphs of functions.</p>	<p>MA.1-The student will investigate and identify the properties of polynomial, rational, piecewise, and step functions and sketch the graphs of the functions.</p> <p>MA.2-The student will investigate and identify the characteristics of exponential and logarithmic functions to graph the function, solve equations, and solve practical problems.</p>
Essential Questions	Common Misconceptions
<ul style="list-style-type: none"> • What is the change in the graph and the equation of a basic function as the graph is translated, reflected, or shows a vertical stretch or shrink? • How is a transformation described? • How is the parent function of a graph described? • How is the type of graph determined when given the equation in (h, k) form? • How is the $y=mx+b$ form of a linear equation derived when given in (h, k) form? 	<p>Students may confuse vertical and horizontal shifts represented in an equation</p> <p>students may not recognize over which axis reflection has occurred</p> <p>Student may confuse types of functions</p> <p>Students may not recognize which function is the parent func</p>

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<ul style="list-style-type: none"> • How is the $y = ax^2 + bx + c$ form of a quadratic equation derived when given in (h, k) form? • How can the graphing calculator be best used to demonstrate transformations? 	
Understanding the Standard	Essential Knowledge and Skills
<ul style="list-style-type: none"> • Knowledge of transformational graphing using parent functions can be used to verify a mathematical model from a scatterplot that approximates the data. • The graph of a parent function is an anchor graph from which other graphs are derived using transformations. • Transformations of graphs include: <ul style="list-style-type: none"> Translations (horizontal and vertical shifting of a graph); Reflections (over the x- and y-axis); and Dilations (stretching and compressing of graphs). • The equation of a line can be determined by two points on the line or by the slope and a point on the line. 	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul style="list-style-type: none"> • Write an equation of a line when given the graph of a line. • Recognize graphs of parent functions for linear, quadratic, exponential and logarithmic functions. • Write the equation of a linear, quadratic, exponential, or logarithmic function in vertex form, given the graph of the parent function and transformation information. • Describe the transformation from the parent function given the equation written in vertex form or the graph of the function. • Given the equation of a function, recognize the parent function and transformation to graph the given function. • Recognize the vertex of a parabola given a quadratic equation in vertex form or graphed. • Describe the parent function represented by a scatterplot.
Vocabulary	

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<p>function, parent function, transformation, translation, reflection, dilation, inverse, exponential, logarithmic, absolute value, square root, cube root, polynomial, pre-image, image, size, shape, position</p>	<p>Textbook Eureka Math Algebra 1 Module 3 Eureka Math Algebra 2 Module 3 Topic C</p>
<p style="text-align: center;">Assessment</p>	<ul style="list-style-type: none"> • Algebra 1, ©2012, Price, et al, McGraw-Hill School Education Group, page(s) 544-549, 567-577 • Algebra 2, ©2012, Price, et al, McGraw-Hill School Education Group, page(s) 109-116, 305-309, 476, 494
<p>Classroom Teacher Developed Assessments</p>	<p>Notes Functions (Math is Fun)</p> <p>Resources</p> <ul style="list-style-type: none"> • Print Coach book Algebra 1, Virginia edition, Lesson(s) 12-14, 17 page(s) 72-93, 106-111 Coach book Algebra 2, Virginia edition, Lesson(s) 18, 20, 22, 23 page(s) 127-133, 141-155 • Technology-based Quadratic Transformations (Desmos) Match my Parabola (Desmos) <p>Station Activities</p> <ul style="list-style-type: none"> • Matching Linear Transformations
<p style="text-align: center;">Cross-Curricular Connections</p>	<p style="text-align: center;">Tiered Differentiations</p>
<p>English-Students may write a story illustrating what is happening in the graph of a function.</p> <p>CTE-Function can be used to illustrate profit, loss, manufacturing, supply, demand, etc.</p>	<p>Tier 1-Students will give the equation based on the graph of the transformation.</p> <p>Tier 2-Students will identify the transformation that was made based on the graph or equation.</p> <p>Tier 3-Students will identify transformed functions when given the parent function</p>