



# **FUNCTIONS, ALGEBRA, & DATA ANALYSIS**

## **CURRICULUM GUIDE**

### **Overview and Scope & Sequence**

**Loudoun County Public Schools**  
**2017-2018**

**(Additional curriculum information and resources for teachers can be accessed through CMS and VISION)**

# Functions, Algebra, and Data Analysis Nine Weeks Overview

## Addendum

1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter
<p><b>Unit 1 – Graphical and Statistical Modeling Intro.</b> AFDA.8 controlling sources of bias and experimental error; data collection; and data analysis and reporting.</p> <p><b>Unit 2 – Linear Functions</b> <b>AFDA.1</b> Domain and range; zeros; intercepts; <a href="#">AFDA.1f</a> – <i>Determining values of a function for elements in its domain (2016)</i> <a href="#">AFDA.1g</a> – <i>Making connections between and among multiple representations of a function (2016)</i> <b>AFDA.2</b> write equation from parent using transformations <b>AFDA.3</b> collect data, equations and interpolation <i>AFDA.3 EKS – Reasonableness of model. (2016)</i> <b>AFDA.4</b> multiple representations including algebraic formulas, graphs, tables, and words <b>AFDA.5</b> optimal values and linear programming</p> <p><b>Unit 3 – Piecewise Functions</b> <b>AFDA.1</b> continuity; domain and range; zeros; intercepts; increasing/decreasing intervals; end behaviors <a href="#">AFDA.1f</a> – <i>Determining values of a function for elements in its domain (2016)</i> <a href="#">AFDA.1g</a> – <i>Making connections between and among multiple representations of a function (2016)</i></p> <p><b>AFDA.2</b> piecewise function equations <b>AFDA.4</b> multiple representations of functions</p> <p><b>Unit 4 – Quadratic Functions (continued into Quarter 2)</b> <b>AFDA.1</b> continuity; local and absolute maxima and minima; domain and range; zeros; intercepts; intervals in which the function is increasing/decreasing; end behaviors <a href="#">AFDA.1f</a> – <i>Determining values of a function for elements in its domain (2016)</i> <a href="#">AFDA.1g</a> – <i>Making connections between and among multiple representations of a function (2016)</i></p>	<p><b>Unit 4 – Quadratic Functions (Continued from Quarter 1)</b> <b>AFDA.2</b> write equation from parent using transformations <b>AFDA.3</b> collect data, curve of best fit, equations and interpolation <a href="#">AFDA.3 EKS</a> – <i>Reasonableness of model. (2016)</i> <b>AFDA.4</b> multiple representations including algebraic formulas, graphs, tables, and words, analysis, interpretation, predictions <b>AFDA.7</b> normal distribution and z-scores</p> <p><b>Unit 5 – Exponential Functions</b> <b>AFDA.1</b> continuity; domain and range; intercepts; intervals in which the function is increasing/decreasing; end behaviors, asymptotes <a href="#">AFDA.1f</a> – <i>Determining values of a function for elements in its domain (2016)</i> <a href="#">AFDA.1g</a> – <i>Making connections between and among multiple representations of a function (2016)</i> <b>AFDA.2</b> write equation from parent using transformations <b>AFDA.3</b> collect data, curve of best fit, equations and interpolation <a href="#">AFDA.3 EKS</a> – <i>Reasonableness of model. (2016)</i> <b>AFDA.4</b> multiple representations including algebraic formulas, graphs, tables, and words, analysis, interpretation, predictions</p> <p><b>Unit 6 – Logarithmic Functions</b> <b>AFDA.1</b> continuity; domain and range; intercepts; intervals in which the function is increasing/decreasing; end behaviors, asymptotes <a href="#">AFDA.1f</a> – <i>Determining values of a function for elements in its domain (2016)</i> <a href="#">AFDA.1g</a> – <i>Making connections between and among multiple representations of a function (2016)</i> <b>AFDA.2</b> write equation from parent using transformations <b>AFDA.3</b> collect data, curve of best fit, equations and interpolation <a href="#">AFDA.3 EKS</a> – <i>Reasonableness of model. (2016)</i> <b>AFDA.4</b> multiple representations including algebraic formulas, graphs, tables, and words, analysis, interpretation, predictions</p>
<p><b>24 blocks</b></p>	<p><b>21 blocks</b></p>

<b>3<sup>rd</sup> Quarter</b>	<b>4<sup>th</sup> Quarter</b>
<p><b>Unit 7 – Function Families</b>  <b>AFDA.2</b>Recognize graphs of parent functions for linear, quadratic, exponential and logarithmic functions.</p> <p><b>AFDA.3</b>Investigate scatterplots and find an equation for the curve of best fit for linear, quadratic, exponential, and logarithmic functions.  <a href="#">AFDA.3 EKS</a> – <i>Reasonableness of model. (2016)</i></p> <p><b>AFDA.4</b>select and use appropriate multiple representations for analysis, interpretation, and prediction.</p> <p><b>AFDA.5</b>Model practical problems with systems of inequalities</p> <p><b>Unit 8 – Statistical Modeling</b>  <b>AFDA.7</b>characteristics of normally distributed data; percentiles; normalizing data using z-scores; and area under the standard normal curve and probability.</p> <p><b>AFDA.8</b> design and conduct an experiment/survey, sample size; sampling technique; controlling sources of bias and experimental error; data collection; and data analysis and reporting.</p>	<p><b>Unit 9 – Probability Modeling</b>  <b>AFDA.6</b>conditional probability; dependent and independent events; addition and multiplication rules; counting techniques (permutations and combinations); and Law of Large Numbers.</p> <p><b>Unit 10 – Financial Modeling</b>  <b>AFDA.3</b> use the best fit equation to model practical problems or applications</p> <p><b>AFDA.4</b>Determine and analyze the appropriate representation of data derived from practical situations.</p> <p><b>AFDA.5</b>Describe the meaning of the maximum or minimum value within its context.</p> <p><b>AFDA.8</b> Write a financial report describing the resulting data and analysis.</p>
<b>21 blocks</b>	<b>23 blocks</b>

## Functions, Algebra, and Data Analysis Scope & Sequence

**Quarter 1:** 24 blocks total

Number of blocks	Standard	Reporting Category	Topic
<b>Unit 1 – Graphical and Statistical Modeling - Intro</b>			
2	AFDA.8 b, c, d	Data Analysis	Introduce collecting data, designing surveys, and understanding multiple representations. (Complete an end of year Algebra I diagnostic assessment.)
<b>Unit 2 – Linear Functions</b>			
10	AFDA.1 c, d, e, f AFDA.2 AFDA.3 AFDA.4 AFDA.5	Algebra and Functions	Algebra I review – Solving equations and inequalities, and graphing Explore characteristics of linear functions; introduce function notation, transformations, and system of equations. Model practical problems using line of best fit and linear programming
<b>Unit 3 – Piecewise Functions</b>			
5	AFDA.1 a, b, c, d, e, f AFDA.2 AFDA.3 AFDA.4	Algebra and Functions	Explore characteristics of piecewise, absolute, and step functions; use function notation and transformations Model practical problems
<b>Unit 4 – Quadratic Functions (continued into Quarter 2)</b>			
7	AFDA.1 a, b, c, d, e, f,	Algebra and Functions	Explore characteristics of quadratic functions; use function notation and transformations
** Assessments embedded into number of blocks per unit**			

**Quarter 2: 21 blocks total**

<b>Number of blocks</b>	<b>Standard</b>	<b>Reporting Category</b>	<b>Topic</b>
<b>Unit 4 – Quadratic Functions (continued from Quarter 1)</b>			
10	AFDA.2 AFDA.3 AFDA.4 AFDA.7 a, b	Algebra and Functions	Using characteristics of quadratic functions, model practical problems using curve of best fit and introduce normal distribution, z-scores, and deviation.
<b>Unit 5 – Exponential Functions</b>			
8	AFDA.1 a, b, c, d, e, f AFDA.2 AFDA.3 AFDA.4	Algebra and Functions	Explore characteristics of exponential functions; use function notation and transformations.  Using characteristics of exponential functions, model practical problems using curve of best fit.
<b>Unit 6 – Logarithmic Functions</b>			
3	AFDA.1 a, b, c, d, e, f AFDA.2 AFDA.3 AFDA.4	Algebra and Functions	Explore characteristics of logarithmic functions; use function notation and transformations.
** Assessments embedded into number of blocks per unit**			

**Quarter 3: 21 blocks total**

<b>Number of blocks</b>	<b>Standard</b>	<b>Reporting Category</b>	<b>Topic</b>
<b>Unit 7 – Function Families</b>			
9	AFDA.1 a, b, c, d, e, f AFDA.2 AFDA.3 AFDA.4 AFDA.5	Algebra and Functions  Data Analysis	Analyze data and select appropriate model given correlation, shape of graph, and context of practical problem.
<b>Unit 8 – Statistical Modeling</b>			
12	AFDA.7 a, b, c, d AFDA.8 a, b, c, d, e	Data Analysis	Explore data through statistical analysis including characteristics of the normal distribution curve.
** Assessments embedded into number of blocks per unit**			

**Quarter 4: 23 blocks total**

<b>Number of blocks</b>	<b>Standard</b>	<b>Reporting Category</b>	<b>Topic</b>
<b>Unit 9 – Probability Modeling</b>			
13	AFDA.6 a, b, c, d, e	Data Analysis	Explore characteristics of probability models.  Determine the probability of event occurrence given a practical problem.
<b>Unit 10 – Financial Modeling</b>			
10	AFDA.3 AFDA.4 AFDA.5 AFDA.8 d, e	Data Analysis	Explore characteristics of financial models with linear programming and/or exponential functions.
** Assessments embedded into number of blocks per unit**			

**Additional information about the Standards of Learning can be found in the**

[VDOE 2009 Curriculum Framework](#)

[VDOE 2016 Curriculum Framework](#)

**(click link above)**

**Additional information about math vocabulary can be found in the**

[VDOE Vocabulary Word Wall Cards](#)

**(click link above)**