Dear AFM Teacher:

Congratulations on your Advanced Functions and Modeling Math 4 course assignment. Advanced Functions and Modeling provides students an in-depth study of modeling and applying functions. Home, work, recreation, consumer issues, public policy, and scientific investigations are just a few of the areas from which applications should originate. Appropriate technology, from manipulatives to calculators and application software, should be used regularly for instruction and assessment. Define and use linear, quadratic, cubic, and exponential functions to model and solve problems. Use systems of two or more equations or inequalities to solve problems. Use the trigonometric ratios to model and solve problems. Use logic and deductive reasoning to draw conclusions
and solve problems.

Prerequisites:

- Describe phenomena as functions graphically, algebraically and verbally; identify independent and dependent quantities, domain, and range, and input/out.
- Translate among graphic, algebraic, numeric, tabular, and verbal representations of relations.
- Define and use linear, quadratic, cubic, and exponential functions to model and solve problems.
- Use systems of two or more equations or inequalities to solve problems.
- Use the trigonometric ratios to model and solve problems.
- Use logic and deductive reasoning to draw conclusions and solve problems.

Note: See Resource Page like the Image below, for supporting Links

www.Mazeworks.com (Games)
http://it.stlawu.edu/~rlock/maa51/java.html (Sample of www resources for teaching statistics)
www.illuminations.nctm.org Lesson Plans, 9-12, Trig Drills
www.mathforum.org Algebra, Lesson Plans, Locker Problem (Recursion)
www.learnnc.org Lesson Plans, Math, Chaos (Probability)
www.cut-the-knot.org/games.shtml (Games)
www.shodor.org/interactivate/activities/plop/index.html
www.shodor.org/interactivate/activities/bargraph/index.html
www.dlt.ncssm.edu/afm Linear Functions, Intro to Data Analysis
Go to AFM Goals, Goal 1, "Guess the Age"
www.mathforum.org/paths/measurement/watermax.html (Students measure angles in order to maximize distance.)
www.standarddeviants.com
www.mathforum.org/dr.math/tocs/trig.high.html
www.catcode.com/trig
www.purplemath.com
www.mathforum.org/probstat
www.dlt.ncssm.edu/Algebra2 Hurricane Fran Activity
www.teacherlink.org/content/math (Activities for TI-83 & Excel)
www.math.com Teacher, Lesson Plans
www.coolmath.com
www.enc.org/weblinks/math
http://aleph0.clarku.edu/~djoyce/java/trig/
www.geocities.com/capecanaveral/launchpad/2426/
www.sportsfigures.espn.com
www.studyworksonline.com
www.webmath.com
http://math.rice.edu/~lanius/Lessons/Series/infinite.htm (Visualizing infinite series)

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Best regards for a successful school year!
2019-2020 District Math Committee

Halifax County Public Schools District (Reviewed August 23, 2019)

Year: ***2003 NC Math Standard Course of Study***

Pacing Guide for Block Scheduling

Advanced Functions and Modeling

Advanced Functions and Modeling provides students an in-depth study of modeling and applying functions. Home, work, recreation, consumer issues, public policy, and scientific investigations are just a few of the areas from which applications should originate. Appropriate technology, from manipulatives to graphing calculators and application software, should be used regularly for instruction and assessment.

First 4½ weeks	Second 4½ weeks	Third 4½ weeks	Fourth 4½ weeks
Unit 1 **Logarithmic Functions to Model & Solve Problems**	**Unit 4** **Bivariate Data: Linear, Polynomial, Exponential, Trigonometric, Power, & Logarithmic Functions**	1.02 e (cont.)	**Unit 7 (Cont.)** 2.05 c Determine if a Series Converges or Diverge
2.01 a Using Tables, Graphs, & Algebraic Properties	1.01 a Interpret the Constants, Coefficients, and Bases	1.02 f (cont.)	2.05 d Recursive & Explicit Representations
2.01 b Interpret the Constants, Coefficients, and Bases	1.01 b Check Models for Goodness-of-fit		
Unit 2 **Piecewise-defined Functions to Model & Solve Problems**		**Unit 6** **Trigonometric Functions: Sine & Cosine to Model & Solve Problems Note: (Study Only Sine& Cosine)**	**Unit 8** **Theoretical & Experimental Probability**
2.02 a Using Tables, Graphs, & Algebraic Properties	**Unit 5** **Univariate Data: Summarize & Analyze to Solve Problems**	2.04 a Using Tables, Graphs, & Algebraic Properties	1.03 a Addition & Multiplication Principles
2.02 b Interpret the Constants, Coefficients, and Bases	1.02 a Methods of Data Collection	2.04 b Transformations with Respect to Period, Amplitude, and Vertical & Horizontal Shifts	1.03 b Permutations & Combinations
	1.02 b Statistical Principles & Methods in Sample Surveys	2.04 c The Law of Sines & The Law of Cosines	1.03 c Simulations for Probability Models

Unit 3 **Power Functions to Model & Solve Problems**	1.02 c Measures of Central Tendency & Spread		1.03 d Expected Values & Fairness
2.03 a Using Tables, Graphs, & Algebraic Properties	1.02 d Normal Distribution Curve	**Unit 7** **Recursively- defined Functions to Model & Solve Problems**	1.03 e Discrete Random Variables
2.03 b Interpret the Constants, Coefficients, and Bases	1.02 e Graphical Displays of Data	2.05 a Sum of a Finite Sequence	1.03 f The Binomial Theorem
	1.02 f Compare Distributions	2.05 b Sum of an Infinite Sequence	

Competency Goal 1: The learner will analyze data and apply probability concepts to solve problems.

Competency Goal 2: The learner will use functions to solve problems.

Essential Questions should be incorporated into daily math activities in order to engage students in real life problem solving.

(**Reviewed: August 23, 2019)**

Halifax County Public Schools

Advanced Functions and Modeling

Year: 2003 NC Math Standard Course of Study

Data Analysis & Probability *The learner will analyze data and apply probability concepts to solve problems.*	**Algebra** *The learner will use functions to solve problems.*
1.01 Create and use calculator-generated models of linear, polynomial, exponential, trigonometric, power, and logarithmic functions of bivariate data to solve problems. a) Interpret the constants, coefficients, and bases in the context of the data. b) Check models for goodness-of-fit; use the most appropriate model to draw conclusions and make predictions. **1.02** Summarize and analyze univariate data to solve problems. a) Apply and compare methods of data collection. b) Apply statistical principles and methods in sample surveys. c) Determine measures of central tendency and spread. d) Recognize, define, and use the normal distribution curve. e) Interpret graphical displays of univariate data. f) Compare distributions of univariate data. **1.03** Use theoretical and experimental probability to model and solve problems. a) Use addition and multiplication principles. b) Calculate and apply permutations and combinations. c) Create and use simulations for probability models. d) Find expected values and determine fairness. e) Identify and use discrete random variables to solve problems. f) Apply the Binomial Theorem.	**2.01** Use logarithmic (common, natural) functions to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret the constants, coefficients, and bases in the context of the problem. **2.02** Use piecewise-defined functions to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret the constants, coefficients, and bases in the context of the problem. **2.03** Use power functions to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret the constants, coefficients, and bases in the context of the problem. **2.04** Use trigonometric (sine, cosine) functions to model and solve problems; justify results. ***(Note: Study Only Sine and Cosine)*** a) Solve using tables, graphs, and algebraic properties. b) Create and identify transformations with respect to period, amplitude, and vertical and horizontal shifts. c) Develop and use the law of sines and the law of cosines. **2.05** Use recursively-defined functions to model and solve problems. a) Find the sum of a finite sequence. b) Find the sum of an infinite sequence. c) Determine whether a given series converges or diverges. d) Translate between recursive and explicit representations.