



Algebra II Pacing & Assessment Guide

JMCSS DEPARTMENT OF CURRICULUM & INSTRUCTION

Unit VI – Exponential and Logarithmic Functions and Equations			
<p>Description: In this unit students strengthen their understanding of the inverse relationship while making connections between exponential and logarithmic functions. Students learn how to use exponential functions to model changes in the values of the dependent variable produced through repeated multiplication by a positive constant. Through fitting models to data, students solidify their understanding of the characteristics of an exponential function. Students then numerically and graphically investigate the transcendental number e and learn about its role in the compounding of interest. Students develop properties of logarithms and use these properties and to solve problems algebraically. Finally, students explore the effects of the parameters on the graphs of exponential and logarithmic functions.</p>			
Domain	Tennessee State Standards	Assessed on TNReady	
		Part I	Part II
Reason Quantitatively and use Units to Solve Problems (Q.A)	N-Q.A.2. Define appropriate quantities for the purpose of descriptive modeling.	X	X
Write Expressions in Equivalent Forms to Solve Problems (SSE.B)	A-SSE.B.3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. ★ c.) Use the properties of exponents to transform expressions for exponential functions. For example the expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{1.2t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.	X	X
Create Equations that Describe Numbers or Relationships (CED.A)	A-CED.A.1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.	X	X
Represent and Solve Equations and Inequalities	A-REI.D.11. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions,	X	X



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Graphically (REI.D)	make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.		
Interpret Functions that Arise in Applications in Terms of the Context (IF.B)	F-IF.B.4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. ★	X	X
	F-IF.B.6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. ★	X	X
Analyze Functions using Different Representations (IF.C)	F-IF.C.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. ★ e.) Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	X	X
	F-IF.C.8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. b.) Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)^{12t}$, $y = (1.2)^{t/10}$, and classify them as representing exponential growth or decay.	X	X
	F-IF.C.9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	X	X
Build a Function that Models a Relationship between Two Quantities (BF.A)	F-BF.A.1. Write a function that describes a relationship between two quantities. ★ a.) Determine an explicit expression, a recursive process, or steps for calculation from a context	X	X
Build New Functions from Existing Functions (BF.B)	F-BF.B.3. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.	X	X



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	F-BF.B.5. (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.		
Construct and Compare Linear, Quadratic, and Exponential Models and Solve Problems (LE.A)	F-LE.A.2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).	X	
	F-LE.A.4. For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a , c , and d are numbers and the base b is 2, 10, or e ; evaluate the logarithm using technology.	X	
Interpret Expressions for Functions in Terms of the Situation they Model (LE.B)	F-LE.B.5. Interpret the parameters in a linear or exponential function in terms of a context.		X
Summarize, Represent, and Interpret Data on Two Categorical and Quantitative Variables (ID.B)	S-ID B.6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a.) Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.		X
Corresponding Baseline Literacy Module			
http://www.jmcss.org/pages/JMCSS/Departments/Curriculum/Resources/BLM/HS/AlgebraII/Module2			