

Common Core State Standards for Mathematics		
Domain: Building Functions		
Building New Functions (F-BF.3-5)		
High School		
Score 4.0	In addition to Score 3.0, in-depth inferences and applications that go beyond instruction to the standard. The student will: - verify, by composition, that one function is the inverse of another (F-BF.4b) - produce an invertible function from a non-invertible function by restricting the domain (F-BF.4d) - understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents (F-BF.5)	Example Activities
	Students will be given several problems involving logarithms and exponents. The students will be required to solve these problems appropriately applying the corresponding inverse function to solve. Students will be required to write a step by step explanation as to how they solved the problems in order to demonstrate a correct understanding of how to apply logarithms to exponents and vice versa.	
	3.5 In addition to score 3.0 performance, in-depth inferences and applications with partial success.	
Score 3.0	The student will: - 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 (F-BF.3) - recognize odd and even functions from their graphs and algebraic expressions for them (F-BF.3) - solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse (F-BF.4a) - read values of an inverse function from a table or graph, given that the function has an inverse (F-BF.4c) - use the relationship between exponents and logarithms to solve problems involving logarithms and exponents (F-BF.5) The student exhibits no major errors or omissions.	<u>Compare Contrast</u> – Students work with a partner when given a function $f(x)$ and a value k and are required to perform the following operations to $f(x)$: $f(x)+k$, $k f(x)$, $f(kx)$, and $f(x+k)$. The students are then required to compare and contrast the effects of k on $f(x)$ for each operation. Students will then repeat the same process for different values of k and for different functions. The groups will then be required to write a summary of how each operation effects the function. The summary will be submitted to the teacher for feedback.
	2.5 No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content	
Score 2.0	There are no major errors or omissions regarding the simpler details and processes as the student will: - recognize or recall specific vocabulary, such as: - inverse functions, compositions of functions, invertible - perform basic processes, such as: - use technology to experiment with cases and illustrate an explanation of the effects 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). (F-BF.3) However, the student exhibits major errors or omissions regarding the more complex ideas and processes.	<u>Freyer Model</u> – Students will be given key vocabulary words such as inverse functions, composition functions, invertible, ... The students will then be tasked to use available resources to define the word, draw a picture that is meaningful for them individually, write an example and non-example.
	1.5 Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content	
Score 1.0	With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.	
	0.5 With help, a partial understanding of the 2.0 content but not the 3.0 content	
Score 0.0	Even with help, no understanding or skill demonstrated.	

