Instructional Focus: Graph and interpret exponential and logarithmic functions

	4 – Mastery	3 – Proficient	2 - Basic	1 – Below Basic	0 – No Evidence
Identify and Find Transformations (F.BF.3)	Can extend thinking beyond the standard, including tasks that may involve one of the following: • Designing • Connecting • Synthesizing • Applying • Justifying • Critiquing • Analyzing • Creating • Proving	Identify the effect on a graph by replacing f(x) with more than two transformations: $f(x) + k$, $k f(x)$, $f(kx)$, $f(x + k)$ for specific positive and negative values of k Given the graph of a function and more than two transformations, find the values of the constants and coefficients	Identify the effect on a graph by replacing f(x) with two transformations: $f(x) + k$, $k f(x)$, $f(kx)$, $f(x + k)$ for specific positive and negative values of k Given the graph of a function and two transformations, find the values of the constants and coefficients	Identify the effect on a graph by replacing f(x) with a single transformation: $f(x) + k$, $k f(x)$, $f(kx)$, $f(x + k)$ for specific positive and negative values of k Given the graph of a function and a single transformation, find the value of the constant or coefficient	Little evidence of reasoning or application to solve the problem Does not meet the criteria in a level 1
Identify key features of graphs (F.IF.7)		Graph exponential and logarithmic functions, and interpret all related key features of a graph in context of a real world situation. • zeros • asymptotes • intercepts • end behavior	Graph exponential and logarithmic functions, and identify all related key features of a graph. • zeros • asymptotes • intercepts • end behavior	Given the graphs of exponential and logarithmic functions, and identify all related key features of a graph. • zeros • asymptotes • intercepts • end behavior	

F.BF.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.*

F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★
d. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.
e. (+) Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

Instructional Focus: Use inverse relationships to solve exponential and logarithmic problems

	4 – Mastery	3 – Proficient	2 - Basic	1 – Below Basic	0 – No Evidence
Exponential and Logarithmic inverses (F.BF.5)	Can extend thinking beyond the standard, including tasks that may involve one of the following: • Designing • Connecting • Synthesizing • Applying • Justifying • Critiquing • Analyzing • Creating • Proving	Recognize that exponential and logarithmic functions are inverses of each other and use these functions to solve **real-world problems**.	Recognize that exponential and logarithmic functions are inverses of each other **and use these functions to solve logarithmic and exponential equations**.	Recognize that exponential and logarithmic functions are inverses of each other and convert from one form into the other.	Little evidence of reasoning or application to solve the problem Does not meet the criteria in a level 1

F.BF.5 (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.