ILLINOIS STATE BOARD OF EDUCATION

MATHEMATICS HIGH SCHOOL FUNCTIONS

Theory of Action: Academic standards represent a collective commitment around what students should learn each year. The state assessment asks students to demonstrate their knowledge, skills, and understanding related to these standards using a common measure. The resulting data allows us to see patterns in performance that should guide school and district improvement, helping identify areas of strength and opportunity.

Role of Performance Level Descriptors in Defining Proficiency: Performance level descriptors bridge the state assessment to classroom instruction and the systems of formative assessments that guide local instruction and choices about individual students. *Academic proficiency represents a <u>range</u> of observable student performance characteristics*. There are multiple pathways to proficiency, and students rely upon their strengths differently within that range of performance.

Proficiency and Difficulty: A student's ability to demonstrate proficiency is influenced by the complexity of the texts or stimuli presented, tasks they're asked to complete, and the contexts in which they are engaged. As student performance improves, students are typically able to handle more challenging texts/stimuli, tasks, and contexts, and are able to demonstrate their skills and knowledge more accurately and consistently.

Functions	*Student performance indicates the ability to...*			
Claim 1	**Below Proficient**	**Approaching Proficient**	**Proficient**	**Above Proficient**
IF.1-9	Work with functions in table or a set of ordered pairs without function notation or variables.	Able to analyze and describe linear functions.	Knowledge expands to linear, quadratic, and exponential functions.	Knowledge expands to logarithmic, rational, radical, and trigonometric functions.
	Make basic inference about the relation based on a linear graph.	Use function notation to evaluate functions for different domains.	Identify domain/range of discrete and continuous functions.	Adjust domain/range of a function in the context of a real-world application.
	Determine rate of change between two given points.	Recognize a function from its definition.	Identify the zeros of quadratic functions graphically and algebraically.	Identify domain/range piecewise functions and functions with discontinuity.
	Identify the slope and intercepts of the function in slope-intercept form.	Identity the slope and intercepts of a linear function written in any form.	Identify and transform a quadratic function and the basic shapes of exponential, and basic shape of radical.	Identify asymptotes, holes, and discontinuities of a function from a graph or function notation.
			Sketch a polynomial function by identifying zeros (when suitable factorizations are available) and using end behavior.	Identify and transform functions with the basic shapes of logarithmic, rational, radical, and trigonometric functions.

Functions	_Student performance indicates the ability to…_		
Claim 2	**Below Proficient**	**Approaching Proficient**	**Proficient**	**Above Proficient**
BF.1-5	Identify that a change has been made to the basic function.	Determine inverse of a linear model.	Determine inverse of a quadratic model if the inverse can be found using square roots.	Compose any two higher order functions.
		Identify the effect on the graph of replacing f(x) with f(x) + k and f(x + k) for specific values of k (both positive and negative).	Identify the effect on the graph of replacing f(x) by k*f(x) for specific values of k (both positive and negative); find the value of k given the graphs.	Identify the effect on the graph of replacing f(x) by f(k*x), for specific values of k (both positive and negative); find the value of k given the graphs.
		Read values of an inverse function from a graph or a table.	Determine even/odd symmetry using table.	Produce an invertible function from a non-invertible function by restricting the domain (for quadratic functions).
		Determine even/odd symmetry using graphs only.	Compose a linear function with another linear or a quadratic function.	Verify two functions being inverses of one another using composition.
				Determine even/odd symmetry algebraically.

Functions	_Student performance indicates the ability to…_		
Claim 3	**Below Proficient**	**Approaching Proficient**	**Proficient**	**Above Proficient**
LE.1-5	Identify key features of linear functions individually. • Identify exponential growth or decay from a graph.	Recognize the differences between linear models and compare their values to analyze the function.	Use the differences in linear and exponential models to compare the data/functions to analyze the functions.	Recognize linear model might be greater than exponential for initial values of x.
	Identify exponential growth or decay from a graph.	Identify exponential growth or decay from equation.	Identify exponential growth or decay from context.	Compare and contrast linear, quadratic, and exponential functions to analyze the functions.