Unit 5: Comparing & Modeling Functions (Linear, Exponential, and Quadratic)

CCSS	4 – Mastery	3 – Proficient	2 - Basic	1 – Below Basic	0 – No Evidence
Average rate of change (F.IF.6) Compare linear and quadratic (F.LE.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	Calculate the average rate of change over a given interval and explain the meaning in context for linear and exponential functions presented symbolically, in a table, **and** in a graph **Describe that an increasing exponential function will eventually exceed a linear function**	Calculate the average rate of change over a given interval **and explain the meaning in context** for linear and exponential functions presented symbolically, in a table, or in a graph	Calculate the average rate of change over a given interval for linear and exponential functions presented symbolically, in a table, or in a graph	Little evidence of reasoning or application to solve the problem Does not meet the criteria in a level 1
Key features (F.IF.7a) Different forms show what on graph (F.IF.8a)		Use factoring and completing the square in a quadratic function to determine ● the vertex ● axis of symmetry, ● direction of opening, ● zeros/roots **in context of the situation** Graph quadratic functions expressed in vertex form and standard form and show key features of the graph **in context of a situation**	**Use factoring and completing the square** in a quadratic function to determine ● the vertex ● axis of symmetry, ● direction of opening, ● zeros/roots Graph quadratic functions expressed in vertex form **and** standard form, and show key features of the graph	**Given a quadratic function** in • vertex form find the vertex; • factored form find the zeros/roots; • standard form find the direction of opening Graph quadratic functions expressed in vertex form **or** standard form, and show key features of the graph	
Exponential graphs (F.IF.7e)		Graph exponential functions expressed in symbolic form and show key features of the graph **(including labels and scales on the graph)**	Graph exponential functions expressed in symbolic form **and show key features of the graph**	Graph exponential functions expressed in symbolic form	
Properties of exponents for exponential functions (F.IF.8b) Interpret parameters in context (F.LE.5)		Differentiate between exponential growth and exponential decay Interpret the growth rate **and the growth factor** of exponential functions in context of the situation	Differentiate between exponential growth and exponential decay **Interpret** the growth rate of exponential functions **in context of the situation**	Differentiate between exponential growth and exponential decay Identify the growth rate of exponential functions	
Compare different representations (F.IF.9)		Compare key features of two functions represented • algebraically • graphically • numerically in tables • verbal descriptions Key features include: ● intercepts ● minimums and maximums ● rate of change ● increasing or decreasing ● **positive or negative** ● **symmetries** **end behavior**	Compare key features of two functions represented • algebraically • graphically • numerically in tables • verbal descriptions Key features include: • intercepts • minimum and maximums • **rate of change** **increasing and decreasing**	Compare key features of two functions represented • algebraically • graphically • numerically in tables • verbal descriptions Key features include: • intercepts minimum and maximums	

Algebraic Transformations (F.BF.3)		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 **(for all listed above),** find the value of the constant or coefficient	Identify the effect on a graph by replacing f(x) with a single transformation **(3 of the 4):** ● 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 **(3 of the 4 listed above),** find the value of the constant or coefficient	Identify the effect on a graph by replacing f(x) with a single transformation **(2 of the 4):** ● 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 **(2 of the 4 listed above),** find the value of the constant or coefficient	
Relationships between functions (F.BF.1a) Distinguish linear vs exponential (F.LE.1) Construct function from multiple representations (F.LE.2)		Distinguish between linear and exponential functions from arithmetic and geometric sequences, tables, graphs, and **real world situations** Write the recursive function and the function rule for linear and exponential functions **to model real world situations.**	Distinguish between linear and exponential functions from arithmetic and geometric sequences, tables, and graphs. **Write the recursive function and the function rule** for linear and exponential functions from arithmetic and geometric sequences and tables.	**Distinguish** between linear and exponential functions from arithmetic and geometric sequences, tables, and graphs. **Identify the common difference/common ratio** for linear and exponential functions from arithmetic and geometric sequences and from tables.	