## Functions

## 1.2 Explore inverse functions (and compositions)

CCSS	4 – Mastery	3 – Proficient	2 - Basic	1 – Below Basic	0 – No
					Evidence
Produce	Can extend	Can do <u>all</u> of the following:	Can do <u>2</u> of the following:	Can do <u>1</u> of the following:	Little
inverse	thinking beyond	<ul> <li>Read values of an</li> </ul>	<ul> <li>Read values of an</li> </ul>	<ul> <li>Read values of an</li> </ul>	evidence of
functions	the standard,	inverse function	inverse function	inverse function	reasoning
(F.BF.4)	including tasks	from a graph and	from a graph and	from a graph and	or
	that may involve	table	table	table	application
	one of the	Given a simple	Given a simple	Given a simple	to solve the
	following:	function, find its	function, find its	function, find its	problem
		inverse	inverse	inverse	
	<ul> <li>Designing</li> </ul>	Compose	Compose	Compose	Does not
	<ul> <li>Connecting</li> </ul>	functions to verify	functions to verify	functions to verify	meet the
	<ul> <li>Synthesizing</li> </ul>	if one function is	if one function is	if one function is	criteria in a
	<ul> <li>Applying</li> </ul>	the inverse of	the inverse of	the inverse of	level 1
	<ul> <li>Justifying</li> </ul>	another function	another function	another function	
	Critiquing				
	<ul> <li>Analyzing</li> </ul>				
Evaluate	<ul> <li>Creating</li> </ul>	Evaluate the composition of	Evaluate the composition of	Evaluate a function for a	
composed	<ul> <li>Proving</li> </ul>	2 functions in context of a	2 functions	given value and use that	
functions		situation		result to <b>evaluate</b> a second	
(F.BF.1c)				function	

F.BF.4 Find inverse functions.

a. (+)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. For example,  $f(x) = 2 x_3$  or f(x) = (x+1)/(x-1) for  $x \neq 1$ .

b. (+) Verify by composition that one function is the inverse of another.

c. (+) Read values of an inverse function from a graph or a table, given that the function has an inverse.

F.BF.1c Write a function that describes a relationship between two quantities.

c. (+) Compose functions. For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time.

## Functions

## 1.3 Explore function transformations

ccss	4 – Mastery	3 – Proficient	2 - Basic	1 – Below Basic	0 – No
					Evidence
Identify	Can extend	Identify the effect on a	Identify the effect on a	Identify the effect on a	Little
transform-	thinking beyond	graph by replacing f(x) with	graph by replacing f(x) with	graph by replacing f(x) with	evidence
ations and	the standard,	more than two	transformations:	a single transformation:	of
key	including tasks	transformations:	f(x) + k, a f(x),	f(x) + k, a f(x),	reasoning
features of	that may involve	f(x) + k, a f(x),	f(bx), f(x + h) for specific	f(bx), f(x + h) for specific	or
graphs	one of the	f(bx), f(x + h) for specific	positive and negative values	positive and negative values	application
(F.IF.7a/b,	following:	positive and negative values	of the constants a, b, h, and	of the constants a, b, h, and	to solve
F.BF.3)		of the constants a, b, h, and	k	k	the
	<ul> <li>Designing</li> </ul>	k			problem
	<ul> <li>Connecting</li> </ul>				
	<ul> <li>Synthesizing</li> </ul>	Write a function given more	Write a function given two	Write a function given <u>a</u>	Does not
	<ul> <li>Applying</li> </ul>	than two transformations.	transformations.	transformation.	meet the
	<ul> <li>Justifying</li> </ul>				criteria in
	<ul> <li>Critiquing</li> </ul>	Graph function	Graph function	Given the graphs of	a level 1
	<ul> <li>Analyzing</li> </ul>	transformations (quadratics,	transformations	functions (quadratics,	
	Creating	square root, cube root,	(quadratics, square root,	square root, cube root,	
	<ul> <li>Proving</li> </ul>	linear, absolute value) and	cube root, linear, absolute	linear, absolute value)	
	-	identify all related key	value) and identify all	identify all related key	
		features of a graph <u>in</u>	related key features of a	features of a graph.	
		context of a situation.	graph <u>.</u>	<ul> <li>lines of symmetry</li> </ul>	
		<ul> <li>lines of symmetry</li> </ul>	<ul> <li>lines of symmetry</li> </ul>	<ul> <li>intercepts</li> </ul>	
		<ul> <li>intercepts</li> </ul>	<ul> <li>intercepts</li> </ul>	<ul> <li>domain/range</li> </ul>	
		<ul> <li>domain/range</li> </ul>	<ul> <li>domain/range</li> </ul>		

F.IF.7a/b Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

- a. Graph linear and quadratic functions and show intercepts, maxima, and minima.
- b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
- 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.