

Build a function that models a relationship between two quantities. Develop models for more complex or sophisticated situations (F.BF.1)	
<p>Standard III.F.BF.1: Write a function that describes a relationship between two quantities.☐</p> <p>b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.</p>	
Concepts and Skills to Master	
<ul style="list-style-type: none"> Combine functions using addition, subtraction, multiplication, or division. Use functions from Secondary I, Secondary II, and Secondary III. 	
Related Standards: Current Course	Related Standards: Future Courses
III.F.BF.all , III.F.IF.all , III.F.LE.3 , III.F.TF.5	P.F.BF.1, P.F.BF.4, P.F.TF.7

Support for Teachers

Critical Background Knowledge
<ul style="list-style-type: none"> Use function notation (I.F.IF.2) Combine functions using arithmetic operations (I.F.BF.3 and II.F.BF.1)
Academic Vocabulary
Resources
Curriculum Resources : http://www.uen.org/core/core.do?courseNum=5630#71635

Build new functions from existing functions (F.BF.3-4)	
Standard III.F.BF.3: Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$, and $f(x+k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Note the effect of multiple transformations on a single function and the common effect of each transformation across function types. Include functions defined only by a graph. Experiment with cases and illustrate an explanation of the effects on the graph using technology. <i>Include recognizing even and odd functions from their graphs and algebraic expressions for them.</i>	
Concepts and Skills to Master	
<ul style="list-style-type: none"> Describe verbally and graphically what will happen when $f(x)$ is replaced by $f(x) + k$, $kf(x)$, $f(kx)$, and $f(x+k)$, where k is any real number. Use all functions studied in Secondary I, Secondary II, and Secondary III. Perform transformations (including multiple transformations) on any function with and without technology. Recognize even and odd functions from their graphs and algebraic expressions. Given a graph of $f(x)$ and $f(x) + k$, $kf(x)$, $f(kx)$, or $f(x+k)$, on the same coordinate axis, find the value of k. 	
Related Standards: Current Course	Related Standards: Future Courses
III.A.SSE.1 , III.F.IF.7 , III.F.IF.8 , III.F.IF.9	P.N.VM.5, P.N.VM.7, P.N.VM.8, P.F.TF.4

Support for Teachers

Critical Background Knowledge
<ul style="list-style-type: none"> Understanding transformations on functions (I.F.BF.3 and II.F.BF.3) Recognize even and odd functions from a graph and as algebraic expressions (II.F.BF.3) Graph functions with and without technology (I.F.IF.7 and II.F.IF.7) Use geometric descriptions of rigid motions to transform figures and predict the effect of transformation (I.G.CO.6)
Academic Vocabulary
even function, odd function, dilation
Resources
Curriculum Resources: http://www.uen.org/core/core.do?courseNum=5630#71635

Build new functions from existing functions (F.BF.3-4)	
<p>Standard III.F.BF.4: Find inverse functions.</p> <p>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. Include linear, quadratic, exponential, logarithmic, rational, square root, and cube root functions. <i>For example, $f(x) = 2x^3$ or $f(x) = (x+1)/(x-1)$ for $x \neq 1$.</i></p>	
Concepts and Skills to Master	
<ul style="list-style-type: none"> Write an expression for the inverse of a function. Consider examining a function and its inverse using numerical, graphical, and algebraic representations. Finding the inverse in Secondary III is a basic exposure to conceptually understand the relationship between a function and its inverse. (Precalculus addresses the following inverse concepts: produce an invertible function from a non-invertible function by restricting the domain, read values of an inverse from a graph or table, and verify by composition that one function is the inverse of another). 	
Related Standards: Current Course	Related Standards: Future Courses
III.A.CED.3 , III.A.CED.4 , III.F.IF.7 , III.F.IF.9 , III.F.LE.4 , III.F.TF.7	P.F.BF.4c, P.F.BF.4d, P.A.REI.9, P.F.TF.6

Support for Teachers

Critical Background Knowledge (Access Background Knowledge)
<ul style="list-style-type: none"> Understand that a function from one set (domain) to another set (range) assigns each element of the domain to exactly one element of the range (8.F.1 and I.F.IF.1) Use function notation (I.F.IF.2) Relate domain of a function to its graph (I.F.IF.5 and II.F.IF.5) Rearrange a formula for a specified variable (I.A.CED.4 and II.A.CED.4) Interpret key features of graphs and tables in terms of quantities (I.F.IF.4 and II.F.IF.4)
Academic Vocabulary
inverse, $f(x)$, $f^{-1}(x)$, one-to-one
Resources
Curriculum Resources : http://www.uen.org/core/core.do?courseNum=5630#71635