

## Core Content

<b>Cluster Title: Build new functions from existing functions.</b>
<b>Standard F.BF.4b(H):</b> Find inverse functions. b) Verify by composition that one function is the inverse of another.
<b>Concepts and Skills to Master</b>
<ul style="list-style-type: none"> <li>• <math>f(f^{-1}(x)) = x</math></li> <li>• <math>f^{-1}(f(x)) = x</math></li> </ul>

## Supports for Teachers

<b>Critical Background Knowledge</b>	
<ul style="list-style-type: none"> <li>• Function notation</li> <li>• Function composition</li> <li>• Domain and range</li> </ul>	
<b>Academic Vocabulary</b>	
inverse	
<b>Suggested Instructional Strategies</b>	<b>Resources</b>
<ul style="list-style-type: none"> <li>• Convert temperatures from Celsius to Fahrenheit and from Fahrenheit to Celsius.</li> <li>• Represent the original and the inverse graphically.</li> </ul>	
<b>Sample Formative Assessment Tasks</b>	
<b>Skill-Based Task:</b>	<b>Problem Task:</b>

### Core Content

<b>Cluster Title: Build new functions from existing functions.</b>
<b>Standard F.BF.4c(H):</b> Find inverse functions. c) Read values of an inverse function from a graph or a table, given that the function has an inverse.
<b>Concepts and Skills to Master</b>
<ul style="list-style-type: none"> <li>• When provided with a table of values for a function, write the table for the inverse function.</li> <li>• When provided with a set of ordered pairs for a function, write the set of ordered pairs for the inverse function.</li> <li>• When provided with a graph of a function, sketch the graph of the inverse function.</li> </ul>

### Supports for Teachers

<b>Critical Background Knowledge</b>	
<ul style="list-style-type: none"> <li>• Domain and range of function</li> <li>• Definition of function</li> <li>• Definition of inverse</li> </ul>	
<b>Academic Vocabulary</b>	
inverse, domain, range, function, ordered pairs	
<b>Suggested Instructional Strategies</b>	<b>Resources</b>
<ul style="list-style-type: none"> <li>• Provide a table of a function whose inverse exists; have students sketch graphs of the function and its inverse.</li> <li>• Provide the graph of a function whose inverse exists; have students create the table of the graph and its inverse.</li> </ul>	
<b>Sample Formative Assessment Tasks</b>	
<b>Skill-Based Task:</b>	<b>Problem Task:</b>

### Core Content

<b>Cluster Title: Build new functions from existing functions.</b>
<b>Standard:</b> F.BF.4d(H): Find inverse functions. d) Produce an invertible function from a non-invertible function by restricting the domain.
<b>Concepts and Skills to Master</b>
<ul style="list-style-type: none"> <li>• Restrict the domain and find the inverse of a function.</li> <li>• Sketch the inverted relation and restrict the domain in such a manner as to create a function.</li> <li>• Provide the table of an inverted relation and restrict the domain in such a manner as to create a function.</li> </ul>

### Supports for Teachers

<b>Critical Background Knowledge</b>	
<ul style="list-style-type: none"> <li>• Domain</li> <li>• Function</li> <li>• Inverse</li> <li>• Graphing</li> <li>• One-to-one</li> </ul>	
<b>Academic Vocabulary</b>	
domain, range, function, inverse, invertible	
<b>Suggested Instructional Strategies</b>	<b>Resources</b>
<ul style="list-style-type: none"> <li>• Provide students with sample graphs of functions that are not one-to-one, and have them sketch the inverted relation and restrict the domains to create functions.</li> </ul>	
<b>Sample Formative Assessment Tasks</b>	
<b>Skill-Based Task:</b>	<b>Problem Task:</b>

### Core Content

<b>Cluster Title: Build new functions from existing functions.</b>
<b>Standard F.BF.5(H):</b> Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.
<b>Concepts and Skills to Master</b>
<ul style="list-style-type: none"> <li>• Write an exponential function in its logarithmic form.</li> <li>• Write a logarithmic function in its exponential form.</li> <li>• Solve exponential and logarithmic equations.</li> </ul>

### Supports for Teachers

<b>Critical Background Knowledge</b>	
<ul style="list-style-type: none"> <li>• Understanding logarithms</li> <li>• Understanding inverses</li> <li>• Understanding exponential functions</li> </ul>	
<b>Academic Vocabulary</b>	
logarithm, inverse, natural logarithm, common logarithm, exponential function	
<b>Suggested Instructional Strategies</b>	<b>Resources</b>
<b>Sample Formative Assessment Tasks</b>	
<b>Skill-Based Task:</b> Solve: $\log_8(x - 3) = 2$ Solve: $2^{x+1} = 7$	<b>Problem Task:</b>