

Grade 8 Math C1 TE

Claim 1: Concepts and Procedures Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.	
Content Domain: Functions	
Target E [m]: Define, evaluate, and compare functions. (DOK 1, 2)	
Tasks associated with this target ask students to relate different functional forms (algebraically, graphically, numerically in tables, or by verbal descriptions). Some tasks for this target will ask students to produce or identify input and output pairs for a given function. Other tasks will ask students to compare properties of functions (e.g., rate of change or initial value).	
Other tasks should ask students to classify functions as linear or nonlinear when expressed in any of the functional forms listed above. Some of these may be connected to 8.SP Target J.	
Standards:	8.F.1, 8.F.2, 8.F.3
DOK Target(s):	1, 2
Evidence Required:	<ol style="list-style-type: none"> 1. The student recognizes that a function is a rule that assigns to each input exactly one output and that the graph of a function is the set of ordered pairs consisting of an input and the corresponding output. 2. The student identifies or produces input and output pairs for given functions. 3. The student recognizes the same function written in different functional forms. 4. The student compares properties of two functions, each represented in a different way. 5. The student interprets the equation $y = mx + b$ as defining a linear function with a graph that is a straight line. 6. The student gives examples of functions that are not linear.
Allowable Item Types*:	SR, CR, TE
Task Models:	<ol style="list-style-type: none"> 1. SR (DOK 1) Prompt Features: The student is prompted to identify whether relations are functions. Stimulus: The student is presented with relations in a variety of representations, including graphical, algebraic, tabular, and written. 1. CR (DOK 1, 2) Prompt Features: The student is prompted to create relations in a variety of representations that are or are not functions. Or the student is prompted to state whether a relation is a function and provide a justification for the statement. Stimulus 1: The student is presented with instructions to create

	<p>a relation that is or is not a function.</p> <p>Stimulus 2: The student is presented with a relation in a variety of representations, including graphical, algebraic, tabular, and written.</p> <p>1. TE (DOK 1, 2)</p> <p>Prompt Features: The student is prompted to graph a function given in a table. Or the student is prompted to create relations that are or are not functions graphically.</p> <p>Stimulus 1: The student is presented with a function given in a table.</p> <p>Stimulus 2: The student is presented with instructions to plot points to create a relation that is or is not a function.</p> <p>Interaction: The student uses a graphing tool to plot points in the coordinate plane.</p> <p>2. SR (DOK 1)</p> <p>Prompt Features: The student is prompted to identify one or more sets of input and output pairs produced by a given function. Or the student is prompted to identify one or more functions that produce a given set of input and output pairs.</p> <p>Stimulus 1: The student is presented with a function represented algebraically or in written form.</p> <p>Stimulus 2: The student is presented with a set of input and output pairs.</p> <p>2. CR (DOK 1, 2)</p> <p>Prompt Features: The student is prompted to create or complete a set of input and output pairs produced by a given function.</p> <p>Stimulus: The student is presented with a function represented algebraically or in written form.</p> <p>3. SR (DOK 1)</p> <p>Prompt Features: The student is prompted to identify different representations of the same function.</p> <p>Stimulus: The student is presented with functions represented in different forms (e.g., algebraically, graphically, numerically in tables, or by written descriptions).</p> <p>4. SR (DOK 2)</p> <p>Prompt Features: The student is prompted to identify one or more correct comparisons between the properties of two different functions represented in different ways. Or the student is prompted to identify a function with properties that compare to the properties of a given function in a certain way.</p> <p>Stimulus 1: The student is presented with functions that may be displayed in a variety of representations, including graphical, algebraic, tabular, and written.</p> <p>Stimulus 2: The student is presented with a function and a comparison statement between the given function and a function to be identified.</p>
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4. CR (DOK 2)

Prompt Features: The student is prompted to state how the properties of two different functions represented in different ways compare to each other. Or the student is prompted to create or complete a function with properties that compare to the properties of a given function in a certain way.

Stimulus 1: The student is presented with functions that may be displayed in a variety of representations, including graphical, algebraic, tabular, and written.

Stimulus 2: The student is presented with a function and a comparison statement between the given function and a function to be created or completed.

4. TE (DOK 2)

Prompt Features: The student is prompted to create or complete the graphical representation of a function with properties that compare to the properties of a given function in a certain way.

Stimulus: The student is presented with a function and a comparison statement between the given function and a function to be graphed. The given function may be displayed in a variety of representations, including algebraic, tabular, and written, but not graphical.

Interaction: The student uses a graphing tool to plot points in the coordinate plane.

5. SR (DOK 1)

Prompt Features: The student is prompted to identify functions described in a variety of ways, such as functions that could be modeled by the equation $y = mx + b$, linear functions, or functions with a graph that is a straight line.

Stimulus: The student is presented with linear and nonlinear functions in a variety of representations, including graphical, algebraic, tabular, and written.

5. CR (DOK 1)

Prompt Features: The student is prompted to create functions described in a variety of ways, such as functions that could be modeled by the equation $y = mx + b$, linear functions, or functions with a graph that is a straight line. The functions may need to be created in a variety of ways, including tabular and written.

Stimulus: The student is presented with instructions about the representation with which the linear function should be created.

5. TE (DOK 1)

Prompt Features: The student is prompted to create functions graphically that are described in a variety of ways, such as functions that could be modeled by the equation $y = mx + b$ or linear functions.

	<p>Stimulus: The student is presented with instructions to create the function graphically.</p> <p>Interaction: The student uses a graphing tool to plot points and draw lines through those points in the coordinate plane.</p> <p>6. SR (DOK 1)</p> <p>Prompt Features: The student is prompted to identify nonlinear functions.</p> <p>Stimulus: The student is presented with linear and nonlinear functions in a variety of representations, including graphical, algebraic, tabular, and written.</p> <p>6. CR (DOK 1, 2)</p> <p>Prompt Features: The student is prompted to create nonlinear functions (which may need to be created in a variety of ways, including algebraic, tabular, and written). Or the student is prompted to state whether a function presented in a variety of ways is nonlinear and provide an explanation for the statement.</p> <p>Stimulus 1: The student is presented with instructions about the representation with which the nonlinear function should be created.</p> <p>Stimulus 2: The student is presented with a function in a variety of representations, including tabular and written.</p> <p>6. TE (DOK 1)</p> <p>Prompt Features: The student is prompted to create nonlinear functions graphically.</p> <p>Stimulus: The student is presented with instructions to create the function graphically.</p> <p>Interaction: The student uses a graphing tool to plot points (and possibly draw lines and curves) in the coordinate plane.</p>
Allowable Stimulus Materials:	Equations of functions without function notation, graphs of functions, tables of functions, written descriptions of functions, sets of ordered pairs, function machines, mathematical mappings, nonmathematical mappings (e.g., the relationship between states and capitals)
Allowable Disciplinary Vocabulary:	Function, relation, linear, nonlinear, input, output, ordered pairs
Allowable Tools:	Graphing software
Target-Specific Attributes	
Key Nontargeted Constructs:	
Accessibility Concerns:	
Sample Items:	MAT.08.CR.1.0000F.E.135, MAT.08.TE.1.0000F.E.140

*SR = selected-response item; CR = constructed-response item; TE = technology-enhanced item; ER = extended-response item; PT = performance task