

Graphing Functions

TEACHER GUIDE

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Activity Overview

This activity may be used as a review of functions. It is set up with self-check answers. Students determine if the graph is a function and, if it is, name the function. The students will also graph various functions and compare/contrast the graphs.

Concepts

- Graphing functions

Tennessee Standards

- Algebra I
 - 3102.1.14 Apply graphical transformations that occur when changes are made to coefficients and constants in functions.
 - 3102.3.16 Determine if a relation is a function from its graph or from a set of ordered pairs.
 - 3102.3.17 Recognize “families” of functions.
 - 3102.3.18 Analyze the characteristics of graphs of basic linear relations and linear functions including constant function, direct variation, identity function, vertical lines, absolute value of linear functions. Use technology where appropriate.
 - 3102.5.6 Draw qualitative graphs of functions and describe a general trend or shape.

Teacher Preparation

- Load or have the students load the tns file: graphing functions.tns
- There is no student sheet with this activity. The teacher may request answers to the compare and contrast questions. If so, the student may write the answers on paper.

TI Nspire Applications

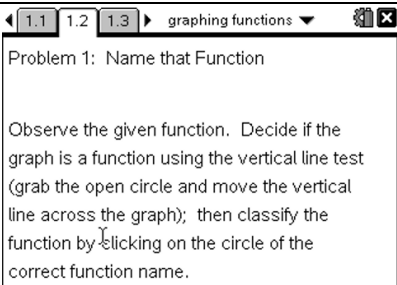
Graphs & Geometry

Notes

Question/Answer

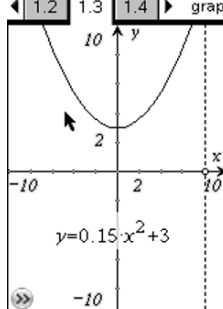
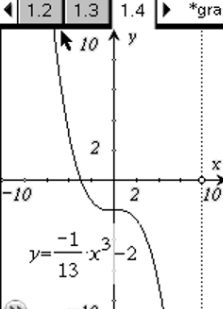
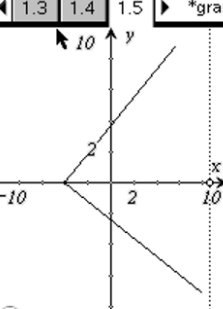
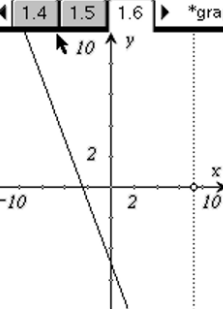
Problem 1

In problem 1 students name the function.

<p>Students observe the given function. They then decide if the graph is a function using the vertical line test; then classify the function by clicking on the circle of the correct function name.</p>	 <p>The screenshot shows a TI Nspire application window titled 'graphing functions'. It displays 'Problem 1: Name that Function' with the following text: 'Observe the given function. Decide if the graph is a function using the vertical line test (grab the open circle and move the vertical line across the graph); then classify the function by clicking on the circle of the correct function name.'</p>
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	 <p>graphing functions</p> <p>Name the function</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> quadratic <input type="checkbox"/> cubic <input type="checkbox"/> linear <input type="checkbox"/> log <input type="checkbox"/> not a function
	 <p>*graphing fu...ons</p> <p>Name the function</p> <ul style="list-style-type: none"> <input type="checkbox"/> piece-wise <input checked="" type="checkbox"/> cubic <input type="checkbox"/> quadratic <input type="checkbox"/> absolute value <input type="checkbox"/> not a function
	 <p>*graphing fu...ons</p> <p>Name the function</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> absolute value <input type="checkbox"/> quadratic <input type="checkbox"/> cubic <input type="checkbox"/> linear <input checked="" type="checkbox"/> not a function
	 <p>*graphing fu...ons</p> <p>Name the function</p> <ul style="list-style-type: none"> <input type="checkbox"/> absolute value <input type="checkbox"/> quadratic <input type="checkbox"/> cubic <input checked="" type="checkbox"/> linear <input type="checkbox"/> not a function

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Problem 2

In problem 2 students graph more than one equation on the same graph of the linear function family. The students then compare and contrast the graphs.

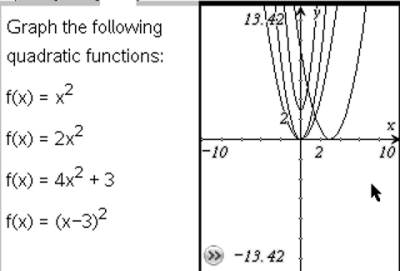
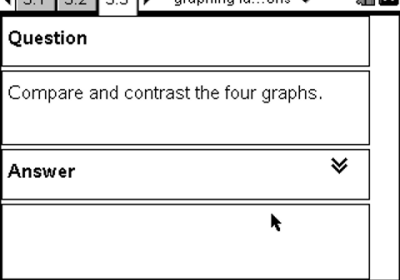
<p>On page 2.2, students graph three linear functions with different slopes and intercepts.</p>	
<p>On page 2.3, students' answers will vary. An example: All three graphs were straight lines but they had different slopes and y-intercepts.</p>	

Problem 3

In problem 3 students graph more than one equation on the same graph of the quadratic function family. The students then compare and contrast the graphs.

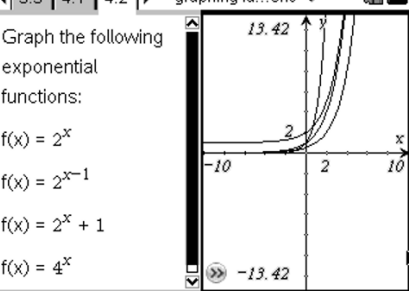
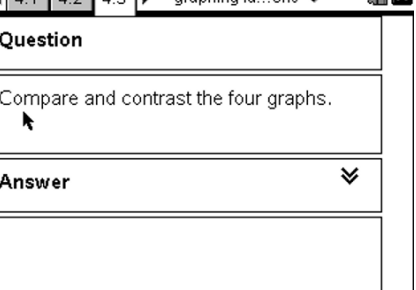
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<p>On page 3.2, students graph quadratic equations with different x-coefficients and y-intercepts.</p>	
<p>On page 3.3, students' answers will vary. An example: All four graphs were parabolas but they had different y-intercepts, different vertices, and different lines of symmetry.</p>	

Problem 4

In problem 4 students graph more than one equation on the same graph of the exponential function family. The students then compare and contrast the graphs.

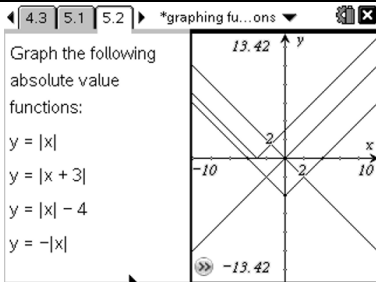
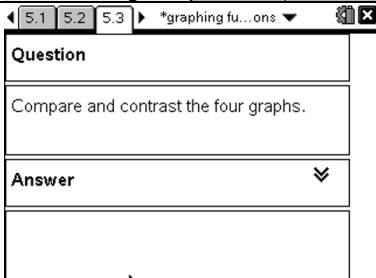
<p>On page 4.2, students graph exponential equations with different exponents and base.</p>	
<p>On page 4.3, students' answers will vary. An example: All four graphs were didn't touch the x-axis. They crossed the y-axis at different coordinates. They are all increasing.</p>	

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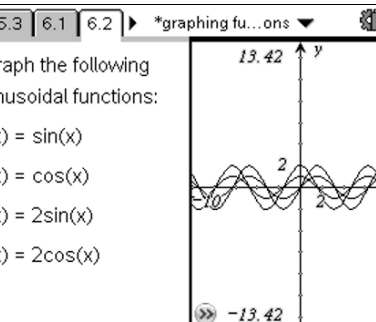
Problem 5

In problem 5 students graph more than one equation on the same graph of the absolute value function family. The students then compare and contrast the graphs.

<p>On page 5.2, students graph absolute value equations.</p>	
<p>On page 5.3, students' answers will vary. An example: All of the graphs form a "v". The graph with the negative on the outside of the absolute value made the graph upside-down. The others were shifted.</p>	

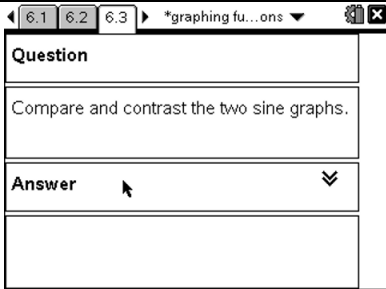
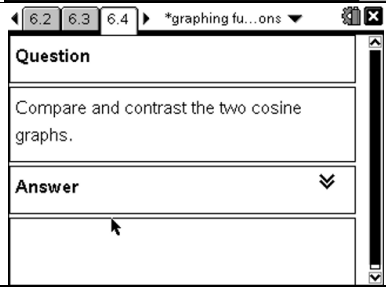
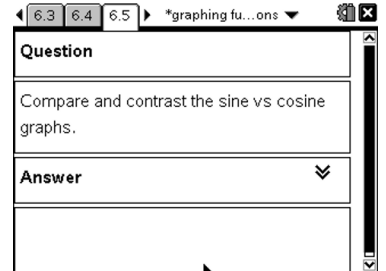
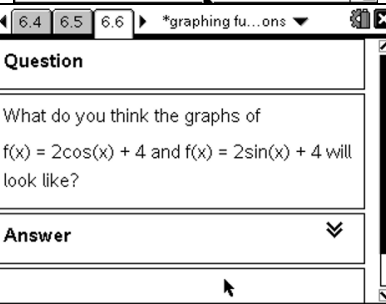
Problem 6

In problem 6 students graph more than one equation on the same graph of the sinusoidal function family. The students then compare and contrast the graphs.

<p>On page 6.2, students graph sinusoidal equations.</p>	
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<p>On page 6.3, students' answers will vary. An example: The graphs have the same wavy pattern but the $2\sin(x)$ is longer.</p>	
<p>On page 6.4, students' answers will vary. An example: The graphs have the same wavy pattern but the $2\cos(x)$ is longer.</p>	
<p>On page 6.5, students' answers will vary. An example: The graphs have the same wavy pattern, but the $\cos(x)$ crosses the y-axis at $(0, 1)$ and the $\sin(x)$ crosses the y-axis at the origin.</p>	
<p>On page 6.6, students' answers will vary. An example: The graphs will have the same wavy pattern and the graphs will move up 4 units, but they will cross the y-axis at different points.</p>	
<p>On page 6.7, the students' will test their prediction.</p>	