



Standard #: MAFS.912.F-IF.3.7

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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.
- c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
- d. Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.
- e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude, and using phase shift.

Grade: 912

Cluster: Analyze functions using different representations. (Algebra 1 - Supporting Cluster) (Algebra 2 - Supporting Cluster) -

Date Adopted or Revised: 02/14

Clusters should not be sorted from Major to Supporting and then taught in that order. To do so would strip the coherence of the mathematical ideas and miss the opportunity to enhance the major work of the grade with the supporting clusters.

Content Complexity Rating: Level 2: Basic Application of Skills & Concepts - [More Information](#)

Date of Last Rating: 02/14

Status: State Board Approved

Assessed: Yes

TEST ITEM SPECIFICATIONS

Assessed with:

MAFS.912.F-IF.3.8

Related Courses

Course Number	Course Title
1200310:	Algebra 1 (Specifically in versions: 2015 and beyond (current))
1200320:	Algebra 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200330:	Algebra 2 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200340:	Algebra 2 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200370:	Algebra 1-A (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200380:	Algebra 1-B (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1207310:	Liberal Arts Mathematics (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1201300:	Mathematical Analysis Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1206330:	Analytic Geometry (Specifically in versions: 2014 - 2015 (course terminated))
1298310:	Advanced Topics in Mathematics (formerly 129830A) (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2000350:	Anatomy and Physiology (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2000360:	Anatomy and Physiology Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2001350:	Astronomy Solar/Galactic (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2020910:	Astronomy Solar/Galactic Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2000320:	Biology 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2000330:	Biology 2 Honors (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 and beyond (current))
2000430:	Biology Technology (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2000370:	Botany (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2003340:	Chemistry 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))

2003350:	Chemistry 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2003360:	Chemistry 2 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2001320:	Earth/Space Science Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2000380:	Ecology (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002480:	Forensic Science 1 (Specifically in versions: 2014 - 2015, 2015 - 2017, 2017 and beyond (current))
2002490:	Forensic Sciences 2 (Specifically in versions: 2014 - 2015, 2015 - 2017, 2017 and beyond (current))
2000440:	Genetics (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002410:	Integrated Science 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002430:	Integrated Science 2 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002440:	Integrated Science 3 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002450:	Integrated Science 3 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2000390:	Limnology (Specifically in versions: 2014 - 2015, 2015 - 2018 (course terminated))
2002500:	Marine Science 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002510:	Marine Science 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002520:	Marine Science 2 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002530:	Marine Science 2 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2003400:	Nuclear Radiation (Specifically in versions: 2014 - 2015, 2015 - 2018 (course terminated))
2020710:	Nuclear Radiation Honors (formerly 202071A) (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2003320:	Physical Science Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2003380:	Physics 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2003390:	Physics 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2003410:	Physics 2 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002540:	Solar Energy Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002550:	Solar Energy 2 Honors (Specifically in versions: 2014 - 2015, 2015 - 2018 (course terminated))
2002330:	Space Technology and Engineering (Specifically in versions: 2014 - 2015, 2015 - 2018 (course terminated))
2000410:	Zoology (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200500:	Advanced Algebra with Financial Applications (Specifically in versions: 2014 - 2015 (course terminated))
1200410:	Mathematics for College Success (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200700:	Mathematics for College Readiness (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002340:	Experimental Science 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002350:	Experimental Science 2 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002360:	Experimental Science 3 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002370:	Experimental Science 4 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
7912080:	Access Algebra 1A (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 - 2019, 2019 and beyond (current))
7912090:	Access Algebra 1B (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 - 2019, 2019 and beyond (current))
7920011:	Access Chemistry 1 (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 and beyond (current))
2000500:	Bioscience 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2000510:	Bioscience 2 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2000520:	Bioscience 3 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002445:	Integrated Science 3 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 - 2020 (course terminated))
2003345:	Chemistry 1 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2003385:	Physics 1 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 - 2020 (course terminated))
1200335:	Algebra 2 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 - 2019 (course terminated))
1200375:	Algebra 1-A for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200385:	Algebra 1-B for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1201315:	Analysis of Functions Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2003836:	Florida's Preinternational Baccalaureate Physics 1 (Specifically in versions: 2015 and beyond (current))
2003838:	Florida's Preinternational Baccalaureate Physics 2 (Specifically in versions: 2015 and beyond (current))
7912095:	Access Algebra 2 (Specifically in versions: 2016 - 2018, 2018 - 2019, 2019 and beyond (current))
1200387:	Financial Algebra (Specifically in versions: 2016 and beyond (current))

Related Access Points

Access Point

Access Points Number	Access Points Title
MAFS.912.F-IF.3.AP.7a:	Select a graph of a function that displays its symbolic representation (e.g., $f(x) = 3x + 5$).
MAFS.912.F-IF.3.AP.7b:	Locate the key features of linear and quadratic equations.

Related Resources

Perspectives Video: Professional/Enthusiast

Name	Description
Asymptotic Behavior in Shark Growth Research:	Fishery Scientist from Florida State University discusses his new research in deep sea sharks and the unusual behavior that is found when the data is graphed.

Virtual Manipulative

Name	Description
Curve Fitting:	With a mouse, students will drag data points (with their error bars) and watch the best-fit polynomial curve form instantly. Students can choose the type of fit: linear, quadratic, cubic, or quartic. Best fit or adjustable fit can be displayed.
Data Flyer:	Using this virtual manipulative, students are able to graph a function and a set of ordered pairs on the same coordinate plane. The constants, coefficients, and exponents can be adjusted using slider bars, so the student can explore the affect on the graph as the function parameters are changed. Students can also examine the deviation of the data from the function. This activity includes supplemental materials, including background information about the topics covered, a description of how to use the application, and exploration questions for use with the java applet.
Equation Grapher:	This interactive simulation investigates graphing linear and quadratic equations. Users are given the ability to define and change the coefficients and constants in order to observe resulting changes in the graph(s).
Function Flyer:	In this online tool, students input a function to create a graph where the constants, coefficients, and exponents can be adjusted by slider bars. This tool allows students to explore graphs of functions and how adjusting the numbers in the function affect the graph. Using tabs at the top of the page you can also access supplemental materials, including background information about the topics covered, a description of how to use the application, and exploration questions for use with the java applet.
Graphing Equations Using Intercepts:	This resource provides linear functions in standard form and asks the user to graph it using intercepts on an interactive graph below the problem. Immediate feedback is provided, and for incorrect responses, each step of the solution is thoroughly modeled.
Graphing Lines:	Allows students access to a Cartesian Coordinate System where linear equations can be graphed and details of the line and the slope can be observed.
Slope Slider:	In this activity, students adjust slider bars which adjust the coefficients and constants of a linear function and examine how their changes affect the graph. The equation of the line can be in slope-intercept form or standard form. This activity allows students to explore linear equations, slopes, and y-intercepts and their visual representation on a graph. This activity includes supplemental materials, including background information about the topics covered, a description of how to use the application, and exploration questions for use with the java applet.
Tool to Explore Exponential Functions:	This is an interactive applet in which students or teachers can visualize how changes in the parameters of the exponential function, $y = a(b)^x + c$, affect the shape of the graph.

Lesson Plan

Name	Description
Dancing Polynomials/Graph Me Baby:	Dancing Polynomials is designed to lead students from the understanding that the equation of a line produces a linear pattern to the realization that using an exponent greater than one will produce curvature in a graph and that further patterns emerge allowing students to predict what happens at the end of the graph. Using graphing calculators, students will examine the patterns that emerge to predict the end behavior of polynomial functions. They will experiment by manipulating equations superimposed onto landmarks in the shape of parabolas and polynomial functions. An end behavior song and dance, called "Graph Me Baby" will allow students to become graphs in order to physically understand the end behavior of the graph.
Exponential Graphing Using Technology:	This lesson is teacher/student directed for discovering and translating exponential functions using a graphing app. The lesson focuses on the translations from a parent graph and how changing the coefficient, base and exponent values relate to the transformation.
Forced To Learn:	Using inquiry techniques, students, working in groups, are asked to design and conduct an experiment to test Newton's Second Law of Motion. Upon being provided with textbooks, rulers, measuring tapes, mini-storage containers, golf balls, marbles, rubber balls, steel balls, and pennies they work cooperatively to implement and revise their hypotheses. With limited guidance from the teacher, students are able to visualize the direct relationships between force and mass; force and acceleration; and the inverse relationship between mass and acceleration.
Forming Quadratics:	This lesson unit is intended to help you assess how well students are able to understand what the different algebraic forms of a quadratic function reveal about the properties of its graphical representation. In particular, the lesson will help you identify and help students who have the following difficulties in understanding how the factored form of the function can identify a graph's roots, how the completed square form of the function can identify a graph's maximum or minimum point, and how the standard form of the function can identify a graph's intercept.
Functions and Everyday Situations:	This lesson unit is intended to help you assess how well students are able to articulate verbally the relationships between variables arising in everyday contexts, translate between everyday situations and sketch graphs of relationships between variables, interpret algebraic functions in terms of the contexts in which they arise and reflect on the domains of everyday functions and in particular whether they should be discrete or continuous.
Graphing Quadratic Equations:	This is an introductory lesson to graphing quadratic equations. This lesson uses graphing technology to illustrate the differences between quadratic equations and linear equations. In addition, it allows students to identify important parts of the quadratic equation and how each piece changes the look of the graph.
Graphing Quadratics Made Easy: Vertex Form of the Equation:	This lesson covers quadratic translations as they relate to vertex form of a quadratic equation. Students will predict what will happen to the graph of a quadratic function when more than one constant is in a quadratic equation. Then, the students will graph quadratic equations in vertex form using their knowledge of the translations of a quadratic function, as well as describe the translations that occur. Students will also identify the parent function of any quadratic function as <input type="text"/> .
How High Can I Go?:	Students will work on graphing quadratic equations; identifying the axis of symmetry, maximum/minimum, vertex, and roots. Students will work in pairs and will get to move around the room matching equations with given graphs.

Leap Frog Review Game:	In this lesson students will demonstrate their knowledge of limits, graphing, and exact trig limits evaluated using substitution. The students will play a game in which they evaluate their own knowledge of problems in the unit, as well as the teacher evaluation the mastery of the problems in the unit. The students receive immediate feedback on their own work and review while the teacher works the problems correcting any errors or misconceptions that the student had while working the problem. This lesson gives the student a power review of the concepts in the unit because the timing is determined by the teacher. All students are engaged and focused while playing this game. Giving students access to the PowerPoint of the game after the lesson provides a good study tool for the students.
Parts and more Parts-- Parabola Fun:	This is an entry lesson into quadratic functions and their shapes. Students see many real-life representations of parabolas. This lesson provides important vocabulary associated with quadratic functions and their graphs in an interactive manner. Students create a foldable and complete a worksheet using their foldable notes.
Representing Polynomials:	This lesson unit is intended to help you assess how well students are able to translate between graphs and algebraic representations of polynomials. In particular, this unit aims to help you identify and assist students who have difficulties in recognizing the connection between the zeros of polynomials when suitable factorizations are available, and graphs of the functions defined by polynomials as well as recognizing the connection between transformations of the graphs and transformations of the functions obtained by replacing $f(x)$ by $f(x + k)$, $f(x) + k$, $-f(x)$, $f(-x)$.
Taming the Behavior of Polynomials:	This lesson will cover sketching the graphs of polynomials while in factored form without the use of a calculator.
Transforming Quadratics - The basics:	This lesson introduces students to the graph of the quadratic parent function. It provides a note taking sheet for students to organize their learning of basic transformations to the parent function. There is a "FUN" cut and paste activity for students to match graphs with verbal descriptions and their equations.

Problem-Solving Task

Name	Description
Finding Parabolas through Two Points:	This problem-solving task challenges students to find all quadratic functions described by given equation and coordinates, and describe how the graphs of those functions are related to one another.
Graphs of Power Functions:	This task requires students to recognize the graphs of different (positive) powers of x .
Graphs of Quadratic Functions:	Students compare graphs of different quadratic functions, then produce equations of their own to satisfy given conditions. This exploration can be done in class near the beginning of a unit on graphing parabolas. Students need to be familiar with intercepts, and need to know what the vertex is. It is effective after students have graphed parabolas in vertex form ($y=a(x-h)^2+k$), but have not yet explored graphing other forms.

Educational Software / Tool

Name	Description
Free Graph Paper:	A variety of graph paper types for printing, including Cartesian, polar, engineering, isometric, logarithmic, hexagonal, probability, and Smith chart.

Formative Assessment

Name	Description
Graphing a Linear Function:	Students are asked to graph a linear function and to find the intercepts of the function as well as the maximum and minimum of the function within a given interval of the domain.
Graphing a Quadratic Function:	Students are asked to graph a quadratic function and answer questions about the intercepts, maximum, and minimum.
Graphing a Rational Function:	Students are asked to graph a rational function with the use of technology and identify key features of the graph.
Graphing a Step Function:	Students are asked to graph a step function, state the domain of the function, and name any intercepts.
Graphing an Exponential Function:	Students are asked to graph an exponential function and to determine if the function is an example of exponential growth or decay, describe any intercepts, and describe the end behavior of the graph.
Graphing Root Functions:	Students are asked to graph two root functions and answer questions about the domain, maxima, and minima.

Tutorial

Name	Description
Graphing Exponential Equations:	This tutorial will help you to learn about the exponential functions by graphing various equations representing exponential growth and decay.
Graphing Quadratic Functions in Vertex Form:	This tutorial will help the students to identify the vertex of a parabola from the equation, and then graph the parabola.
Graphing Quadratic Equations:	This tutorial will help the learners to graph the equation of the quadratic function using the coordinates of the vertex of a parabola and its x - intercepts.
Graphs and Solutions of Functions in Quadratic Equations:	You will learn how the parent function for a quadratic function is affected when $f(x) = x^2$.
Linear Functions:	In this tutorial, "Linear functions of the form $f(x) = ax + b$ and the properties of their graphs are explored interactively using an applet." The applet allows students to manipulate variables to discover the changes in intercepts and slope of the graphed line. There are six questions for students to answer, exploring the applet and observing changes. The

Video/Audio/Animation

Name	Description
Graphing Lines 1:	Khan Academy video tutorial on graphing linear equations: "Algebra: Graphing Lines 1"

Original Student Tutorial

Name	Description
Graphing Quadratic Functions:	The graph of a quadratic equation is called a parabola [puh-ra-bow-luh]. The key features we will focus on in this tutorial are the vertex (a maximum or minimum extreme) and the direction of its opening. You will learn how to examine a quadratic equation written in vertex form in order to distinguish each of these key features.

Perspectives Video: Expert

Name	Description
Jumping Robots and Quadratics:	Jump to it and learn more about how quadratic equations are used in robot navigation problem solving!
Mathematically Exploring the Wakulla Caves:	The tide is high! How can we statistically prove there is a relationship between the tides on the Gulf Coast and in a fresh water spring 20 miles from each other?
Using Mathematics to Optimize Wing Design:	Nick Moore discusses his research behind optimizing wing design using inspiration from animals and how they swim and fly.

Worksheet

Name	Description
Quadratic Functions:	This worksheet gives students one place to show all transformations (reflections, vertical stretches/compressions, and translations) for the quadratic function. The worksheet also has a place for domain and range for each transformation.

Unit/Lesson Sequence

Name	Description
Quadratic Functions: Workshop 4:	Lesson 1 of two lessons requires students to explore quadratic functions by examining the family of functions described by $y = a(x - h)^2 + k$. In Lesson 2 students explore quadratic functions by using a motion detector known as a Calculator Based Ranger (CBR) to examine the heights of the different bounces of a ball. Students will represent each bounce with a quadratic function of the form $y = a(x - h)^2 + k$. Background information, resources, references and videos of the lessons are included. Students work in teams of four.
	This sample Algebra 1 CMAP is a fully customizable resource and curriculum-planning tool that provides a framework for the Algebra 1 Course. The units and standards are customizable and the CMAP allows instructors to add lessons, worksheets, and other resources as needed. This CMAP also includes rows that automatically filter and display Math Formative Assessments System tasks, E-Learning Original Student Tutorials and Perspectives Videos that are aligned to the standards, available on CPALMS.
	Learn more about the sample Algebra 1 CMAP, its features and customizability by watching the following video:
Sample Algebra 1 Curriculum Plan Using CMAP:	
	<h3>Using this CMAP</h3> <p>To view an introduction on the CMAP tool, please click here.</p> <p>To view the CMAP, click on the "Open Resource Page" button above; be sure you are logged in to your iCPALMS account.</p> <p>To use this CMAP, click on the "Clone" button once the CMAP opens in the "Open Resource Page." Once the CMAP is cloned, you will be able to see it as a class inside your iCPALMS My Planner (CMAPs) app.</p> <p>To access your My Planner App and the cloned CMAP, click on the iCPALMS tab in the top menu.</p>

Assessment

Name	Description
Sample 1 - High School Algebra 1 State Interim Assessment:	This is the State Interim Assessment for high school.
Sample 1 - High School Algebra 2 State Interim Assessment:	This is a State Interim Assessment for 9th-12th grades.
Sample 2 - High School Algebra 2 State Interim Assessment:	This is a State Interim Assessment for 9th-12th grades.
Sample 4 - High School Algebra 1 State Interim Assessment:	This is a State Interim Assessment for 9th-12th grades.
Sample 4 - High School Algebra 2 State Interim Assessment:	This is a State Interim Assessment for 9th-12th grade.

Student Resources

Name	Description
Curve Fitting:	With a mouse, students will drag data points (with their error bars) and watch the best-fit polynomial curve form instantly. Students can choose the type of fit: linear, quadratic, cubic, or quartic. Best fit or adjustable fit can be displayed.
Data Flyer:	Using this virtual manipulative, students are able to graph a function and a set of ordered pairs on the same coordinate plane. The constants, coefficients, and exponents can be adjusted using slider bars, so the student can explore the affect on the graph as the function parameters are changed. Students can also examine the deviation of the data from the function. This activity includes supplemental materials, including background information about the topics covered, a description of how to use the application, and exploration questions for use with the java applet.
Equation Grapher:	This interactive simulation investigates graphing linear and quadratic equations. Users are given the ability to define and change the coefficients and constants in order to observe resulting changes in the graph(s).
Finding Parabolas through Two Points:	This problem-solving task challenges students to find all quadratic functions described by given equation and coordinates, and describe how the graphs of those functions are related to one another.
Function Flyer:	In this online tool, students input a function to create a graph where the constants, coefficients, and exponents can be adjusted by slider bars. This tool allows students to explore graphs of functions and how adjusting the numbers in the function affect the graph. Using tabs at the top of the page you can also access supplemental materials, including background information about the topics covered, a description of how to use the application, and exploration questions for use with the java applet.
Graphing Equations Using Intercepts:	This resource provides linear functions in standard form and asks the user to graph it using intercepts on an interactive graph below the problem. Immediate feedback is provided, and for incorrect responses, each step of the solution is thoroughly modeled.
Graphing Exponential Equations:	This tutorial will help you to learn about the exponential functions by graphing various equations representing exponential growth and decay.
Graphing Lines:	Allows students access to a Cartesian Coordinate System where linear equations can be graphed and details of the line and the slope can be observed.
Graphing Lines 1:	Khan Academy video tutorial on graphing linear equations: "Algebra: Graphing Lines 1"
Graphing Quadractic Functions in Vertex Form:	This tutorial will help the students to identify the vertex of a parabola from the equation, and then graph the parabola.
Graphing Quadratic Equations:	This tutorial will help the learners to graph the equation of the quadratic function using the coordinates of the vertex of a parabola adn its x- intercepts.
Graphing Quadratic Functions:	The graph of a quadratic equation is called a parabola [puh-ra-bow-luh]. The key features we will focus on in this tutorial are the vertex (a maximum or minimum extreme) and the direction of its opening. You will learn how to examine a quadratic equation written in vertex form in order to distinguish each of these key features.
Graphs and Solutions of Functions in Quadratic Equations:	You will learn how the parent function for a quadratic function is affected when $f(x) = x^2$.
Graphs of Power Functions:	This task requires students to recognize the graphs of different (positive) powers of x.
Graphs of Quadratic Functions:	Students compare graphs of different quadratic functions, then produce equations of their own to satisfy given conditions.
Graphs of Quadratic Functions:	This exploration can be done in class near the beginning of a unit on graphing parabolas. Students need to be familiar with intercepts, and need to know what the vertex is. It is effective after students have graphed parabolas in vertex form

$(y=a(x-h)^2+k)$, but have not yet explored graphing other forms.

Jumping Robots and Quadratics:	Jump to it and learn more about how quadratic equations are used in robot navigation problem solving!
Mathematically Exploring the Wakulla Caves:	The tide is high! How can we statistically prove there is a relationship between the tides on the Gulf Coast and in a fresh water spring 20 miles from each other?
Slope Slider:	In this activity, students adjust slider bars which adjust the coefficients and constants of a linear function and examine how their changes affect the graph. The equation of the line can be in slope-intercept form or standard form. This activity allows students to explore linear equations, slopes, and y-intercepts and their visual representation on a graph. This activity includes supplemental materials, including background information about the topics covered, a description of how to use the application, and exploration questions for use with the java applet.
Tool to Explore Exponential Functions:	This is an interactive applet in which students or teachers can visualize how changes in the parameters of the exponential function, $y = a(b)^x + c$, affect the shape of the graph.

Parent Resources

Name	Description
Finding Parabolas through Two Points:	This problem-solving task challenges students to find all quadratic functions described by given equation and coordinates, and describe how the graphs of those functions are related to one another.
Graphing Lines:	Allows students access to a Cartesian Coordinate System where linear equations can be graphed and details of the line and the slope can be observed.
Graphing Lines 1:	Khan Academy video tutorial on graphing linear equations: "Algebra: Graphing Lines 1"
Graphs of Power Functions:	This task requires students to recognize the graphs of different (positive) powers of x. Students compare graphs of different quadratic functions, then produce equations of their own to satisfy given conditions.
Graphs of Quadratic Functions:	This exploration can be done in class near the beginning of a unit on graphing parabolas. Students need to be familiar with intercepts, and need to know what the vertex is. It is effective after students have graphed parabolas in vertex form $(y=a(x-h)^2+k)$, but have not yet explored graphing other forms.