



# **B.E.S.T.** Standards for **MATH**

**Algebra 1**  
**Geometry**  
**Algebra 2**

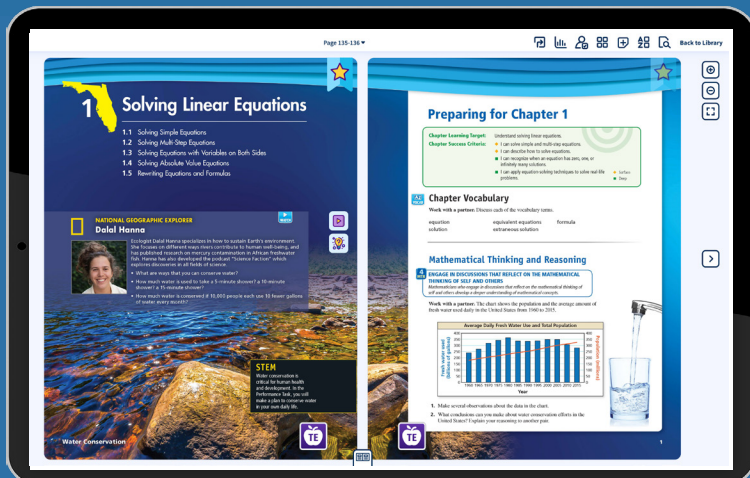


## A K–12 Program Built for Florida

Big Ideas Learning's entirely NEW *Florida's B.E.S.T. Standards for MATH Algebra 1, Geometry, and Algebra 2* program empowers Florida educators and ignites student learning from kindergarten through high school (K–12).

*Florida's B.E.S.T. Standards for MATH* was developed through a rich collaboration with Florida-based math education experts and explicitly adheres to the Florida's B.E.S.T. Standards for Mathematics. The precise language of each Florida benchmark, including those that address Honors pathways, is featured within the Student and Teaching Editions, making the expectations clear to both students and teachers. The integration of the Mathematical Thinking and Reasoning Standards (MTRs), and purposeful exploration through the eyes of STEM with National Geographic Explorers, fosters student achievement and provides teachers with the instructional guidance needed to reach all students.

Using the latest educational research, the program incorporates strategies that are proven to have the highest impact on student achievement, while supporting the B.E.S.T. Standards. This instructional approach forms a clear, concise, and comprehensive, vertically aligned solution to help accelerate learning for *all* Florida students.

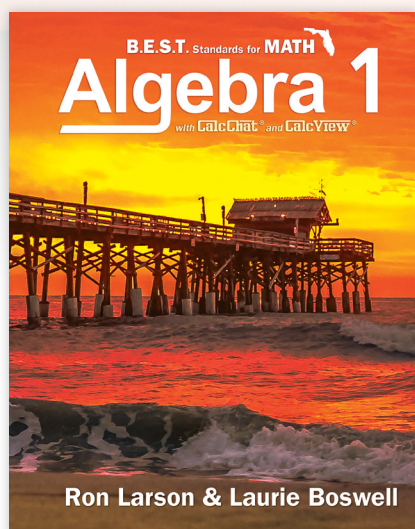


## Coherent K–12 Progression from a Single Authorship Team

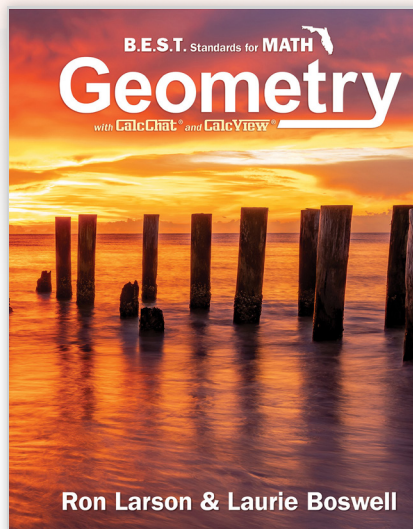
Written by a renowned, single authorship team, the program provides a cohesive, coherent, and rigorous mathematics curriculum that encourages students to become strategic thinkers and problem solvers.



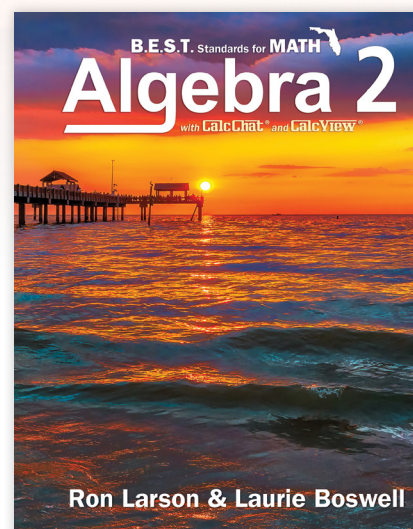
*Honors pathways are also covered using resources in print, digitally, or a blend of both!!*



ALGEBRA 1



GEOMETRY



ALGEBRA 2



**Ron Larson, Ph.D.**

*“Laurie Boswell and I wholeheartedly endorse Florida’s Benchmarks for Excellent Student Thinking (B.E.S.T.) Standards. When these standards were announced, we immediately went to work to write and develop a program that embraces the Florida B.E.S.T. Standards. We are confident that Big Ideas Learning’s all-new K–12 program written specifically for Florida will represent a new level of achievement and understanding in mathematics education.”*



**Laurie Boswell, Ed.D.**

*“We developed our new K–12 program to support teacher implementation of Florida’s Benchmarks for Excellent Student Thinking (B.E.S.T.) Standards. The alignment with the B.E.S.T. Standards and the integration of the Mathematical Thinking and Reasoning Standards will ensure that all students engage with mathematics in meaningful ways that promote a deeper learning and understanding of mathematics.”*

# Algebra 1, Geometry, Algebra 2

## Integrated Mathematical Thinking and Reasoning

With *Florida's B.E.S.T. Standards for MATH*, students develop mathematical mindsets through integrated **Mathematical Thinking and Reasoning Standards (MTRs)**. Throughout the program, students can consciously learn, demonstrate, and self-assess their understanding of the MTRs. Call outs and labels throughout the Student Edition make it easy for students to identify which MTRs they are addressing. Additionally, teachers have access to valuable MTR support at point of use in the **Teaching Edition** through **Laurie's Notes**.

$x$	-9	-4	-2	-1
$f(x)$	0	20	0	-16

### EXAMPLE 1 Writing a Quadratic Function



Write a quadratic function in standard form that models the table.

#### SOLUTION

The given points indicate that the  $x$ -intercepts are  $-9$  and  $-2$ . So, use intercept form to write a function.

$$\begin{aligned} f(x) &= a(x - p)(x - q) && \text{Intercept form} \\ &= a(x + 9)(x + 2) && \text{Substitute for } p \text{ and } q. \end{aligned}$$

Use another given point, such as  $(-4, 20)$ , to find the value of  $a$ .

$$\begin{aligned} 20 &= a(-4 + 9)(-4 + 2) && \text{Substitute } -4 \text{ for } x \text{ and } 20 \text{ for } f(x). \\ 20 &= a(5)(-2) && \text{Simplify.} \\ -2 &= a && \text{Solve for } a. \end{aligned}$$

► So, the function is  $f(x) = -2(x + 9)(x + 2)$ , or  $f(x) = -2x^2 - 22x - 36$ .

#### 1 MTR ANALYZE A PROBLEM

Explain why you can use any point other than  $(-9, 0)$  and  $(-2, 0)$  to find the value of  $a$ .

### MTR 1.1

Students **actively participate in effortful learning** by maintaining a positive mindset, persevering, asking questions, and helping each other.

#### 2 MTR

21. **MULTIPLE REPRESENTATIONS** The table shows the balance of a savings account over time. Represent the situation in words and in a coordinate plane. Does the situation represent a function? Explain.

Month, $x$	0	1	2	3	4
Balance (dollars), $y$	100	125	150	175	200

### MTR 2.1

Students **demonstrate understanding by representing problems in multiple ways** through modeling and progress from choosing representations to using algorithms and equations.

#### 3 MTR

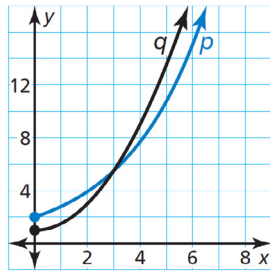
36. **CHOOSE A METHOD** Describe two methods for solving a quadratic equation by graphing. Which method do you prefer? Explain your reasoning.

### MTR 3.1

When students **complete tasks with mathematical fluency**, they select efficient methods, complete tasks accurately, and use feedback to improve efficiency.

**4 MTR 15. MAKING AN ARGUMENT**

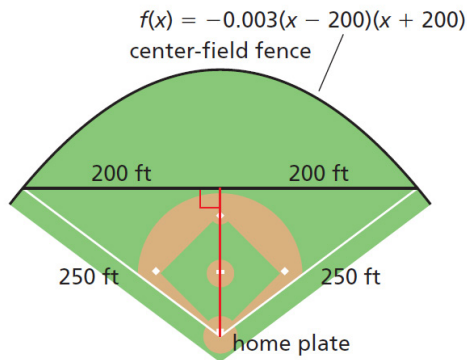
Function  $p$  is an exponential function, and function  $q$  is a quadratic function. Your friend says that after about  $x = 3$ , function  $q$  will always have a greater  $y$ -value than function  $p$ . Is your friend correct? Explain.



**MTR 4.1**

Students who **engage in discussions that reflect on the mathematical thinking** construct arguments and communicate mathematical ideas effectively.

- 5 MTR 49. CONNECTING CONCEPTS** The dimensions of a baseball field are shown. Let  $x$  represent the horizontal distance (in feet) from home plate and  $f(x)$  represent the vertical distance (in feet) from the base of the triangle. Find the distance from home plate to the center-field fence. Justify your answer.



**MTR 5.1**

Students **use patterns and structure to help understand and connect mathematical concepts** by focusing on details, finding logical order, or breaking down a problem into smaller parts.

- 6 MTR 40. ASSESS REASONABLENESS** You and a friend observe the Mug Race along the St. Johns River. The table shows how many sailboats you see. Graph the linear function. Your friend claims you will see 110 sailboats by hour 6. Is your friend's claim reasonable? Explain.

Time (hours), $x$	0	1	2	3	4
Number of boats, $y$	0	15	30	45	60

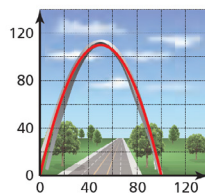
**MTR 6.1**

When students **assess the reasonableness of solutions**, they are developing a habit of checking their calculations when solving problems.

**7 MTR EXAMPLE 4 Modeling Real Life**



The Sunshine State Arch in Miami Gardens forms a parabola that can be modeled by  $y = -0.044x^2 + 4.4x$ , where  $x$  and  $y$  are measured in feet. Find and interpret the maximum value of the function.



**SOLUTION**

To find the minimum value, find the  $y$ -coordinate of the vertex.

**MTR 7.1**

Students who **apply mathematics to real-world contexts**, connect concepts to everyday experiences and use models and methods to understand, represent, and solve problems.

**Get your free MTR classroom poster!**




# Algebra 1, Geometry, Algebra 2

## Focus and Coherence Geared Toward Fluency

### Focus on Florida Benchmarks

By showcasing the precise language of the Florida benchmarks, **Learning Targets** and **Success Criteria** support and align to those Florida-specific expectations, giving students clarity around lesson goals.



**8.4 Graphing  $f(x) = a(x - h)^2 + k$**

**Learning Target:** Multiply and factor algebraic expressions.

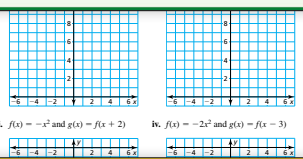
**Success Criteria:**

- I can multiply algebraic expressions.
- I can identify the greatest common factor of terms, including variable terms.
- I can use the Distributive Property to factor algebraic expressions.

**Algebraic Reasoning**

**MA.8.AR.1.2** Apply properties of operations to multiply two linear expressions with rational coefficients.

**MA.8.AR.1.3** Rewrite the sum of two algebraic expressions having a common monomial factor as a common factor multiplied by the sum of two algebraic expressions.



iii.  $f(x) = -x^2$  and  $g(x) = f(x + 2)$

iv.  $f(x) = -2x^2$  and  $g(x) = f(x - 3)$

**Algebraic Reasoning**

MA.912.AR.3.7 Given a table, equation or written description of a quadratic function, graph that function, and determine and interpret its key features.

Functions

MA.912.F.2.1 Identify the effect on the graph or table of a given function after replacing  $f(x)$  by  $f(x) + k$ ,  $kf(x)$ ,  $f(kx)$  and  $f(x + k)$  for specific values of  $k$ .

Also MA.912.AR.3.6, MA.912.AR.3.8, MA.912.E.2.3

**8.4 Graphing  $f(x) = a(x - h)^2 + k$  417**

### Coherence of B.E.S.T. Progressions

A seamless progression of topics within and between grades creates a coherent curriculum for students and guarantees topics are not taught in isolation.

## B.E.S.T. Standards: PROGRESSIONS

COHERENCE Through the Grades		
Prior Learning	Current Learning	Future Learning
<b>Middle School</b> <ul style="list-style-type: none"> <li>• <b>MA.8.GR.2.3</b> Describe and apply translations, reflections, rotations, and dilations using coordinates and the coordinate plane.</li> <li>• <b>MA.8.AR.3.3</b> Write linear functions to model relationships.</li> <li>• <b>MA.8.AR.3.4</b> Graph linear functions.</li> <li>• <b>MA.8.F.1.2</b> Recognize linear functions represented as tables, equations, and graphs.</li> </ul>	<b>Chapter 8</b> <ul style="list-style-type: none"> <li>• <b>MA.912.AR.3.6</b> Identify and interpret the vertex and zeros of a quadratic function.</li> <li>• <b>MA.912.AR.3.7</b> Graph quadratic functions of different forms and identify and interpret their key features.</li> <li>• <b>MA.912.F.2.1</b> Explain how translations, reflections, stretches, and shrinks affect graphs of quadratic functions.</li> <li>• <b>MA.912.AR.3.8</b> Use quadratic functions to solve real world problems.</li> </ul>	<b>Algebra 1</b> <ul style="list-style-type: none"> <li>• <b>MA.912.AR.3.1</b> Write and solve quadratic equations by graphing, using square roots, completing the square, and using the Quadratic Formula.</li> <li>• <b>MA.912.AR.3.6</b> Find the vertex and zeros of a quadratic function and interpret them in terms of a real-world context.</li> <li>• <b>MA.912.AR.1.2</b> Rearrange formulas to highlight a quantity of interest.</li> </ul>

## Fluency to Support Rigor

Florida's B.E.S.T. Standards for MATH helps teachers close the rigor gap by empowering students to grow and thrive in their unique scholastic ways. In every lesson, students engage in all aspects of rigor: conceptual understanding, procedural fluency, and application.

**EXAMPLE 3** Using Structure to Solve a Multi-Step Equation

Solve  $2(1 - x) + 3 = -8$ . Check your solution.

**SOLUTION**

**Method 1** One way to solve the equation is by

$$\begin{array}{rcl} 2(1 - x) + 3 & = & -8 \\ 2(1) - 2(x) + 3 & = & -8 \\ 2 - 2x + 3 & = & -8 \\ -2x + 5 & = & -8 \\ -2x & = & -13 \\ -2x & = & -13 \\ -2 & & -2 \\ x & = & 6.5 \end{array}$$

Write the equation.  
Distributive Property.  
Multiply.  
Combine like terms.  
Subtraction Property of Equality.  
Simplify.  
Division Property of Equality.  
Simplify.

**REMEMBER**  
The Distributive Property states the following for real numbers  $a$ ,  $b$ , and  $c$ .  
Sum  
 $a(b + c) = ab + ac$   
Difference  
 $a(b - c) = ab - ac$

► The solution is  $x = 6.5$ .

**3 MTR REFLECT ON YOUR METHOD**

Explain why it is convenient to first solve for the expression  $1 - x$ , and then solve for  $x$ . How else could you solve the equation?

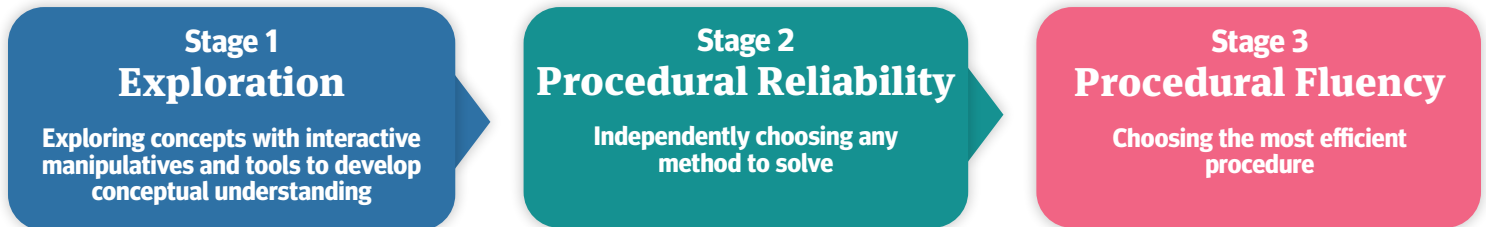
**Check**

$$\begin{array}{rcl} 2(1 - x) + 3 & = & -8 \\ 2(1 - 6.5) + 3 & = & -8 \\ -8 & = & -8 \end{array}$$

## Conceptual Understanding and Procedural Fluency

Florida's B.E.S.T. Standards for MATH was purposefully and intentionally designed to meet the B.E.S.T. Standards and to help students reach automaticity.


Throughout each stage of fluency, students progress from



## Using MTR 7.1: Real-World Applications to Enhance Rigor

**Model Real Life, Dig Deeper, STEAM Performance Tasks**, and other non-routine problems help students reach deep levels of learning. With the incorporation of real-world, Florida-themed content, students are encouraged to think strategically to solidify math connections and transfer their learning to new contexts in the world around them.

**7 MTR**



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**EXAMPLE 6** Modeling Real Life **WATCH**

The Water Dome at Florida Southern College consists of a circular arrangement of 75 water jets. The height (in feet) of the water from one of the jets can be approximated by  $f(x) = -0.037(x - 10)(x - 80)$ , where  $x$  is the horizontal distance (in feet) from the edge of the circular pool. Graph the function. Find and interpret the domain and range in this context.

**SOLUTION**

**Step 1** Identify the  $x$ -intercepts. Because the  $x$ -intercepts are  $p = 10$  and  $q = 80$ , plot  $(10, 0)$  and  $(80, 0)$ .

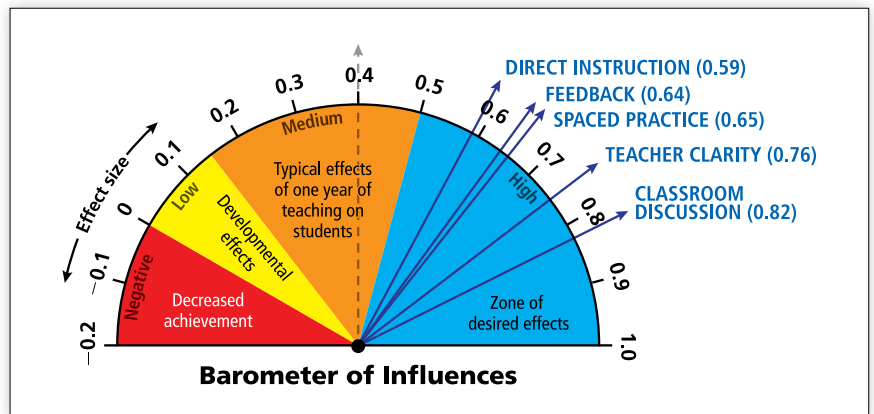
**Step 2** Find and graph the axis of symmetry.

$$x = \frac{p + q}{2} = \frac{10 + 80}{2} = 45$$

# Algebra 1, Geometry, Algebra 2

## Five Highest-Impact Teaching Strategies

Florida's B.E.S.T. Standards for MATH incorporates the highest-impact teaching strategies from Professor John Hattie's *Visible Learning* research. Reinforced throughout the program, these five strategies are proven to have the greatest impact on student achievement, giving all Florida students the opportunity to be successful.



### Teacher Clarity

**Learning Targets** and **Success Criteria** are incorporated into every chapter and lesson and reflect the Florida B.E.S.T. Standards for Mathematics, allowing teachers to clearly communicate learning expectations.

## 8.8 Modeling with Quadratic Functions

**Learning Target:** Write quadratic functions from tables, graphs, and verbal descriptions.

- Success Criteria:**
- I can write a quadratic function given a vertex and a point.
  - I can write a quadratic function given x-intercepts and a point.
  - I can use quadratic functions to solve real-life problems.

### Feedback

Providing students with timely and relevant feedback is crucial so that students make connections and further their understanding. Throughout the program, students can self-assess to determine what they are learning, where they are in their learning, and where they are going next.

#### Where Are We In Our Learning?

Connect each success criteria to exercises in the Self-Assessment. Then ask, "If you are not confident in your learning today, what do you need to do next?" You want students to identify the steps they need to take so they can move forward in their learning.

## Classroom Discussion

As outlined in MTR 4.1, when students can discuss purposeful questions, they hone their ability to mathematically communicate, construct arguments, and justify conclusions. **Turn and Talk**, found in **Laurie's Notes**, allows students to frequently analyze each other's mathematical thinking.

## Laurie's Notes

**Turn and Talk:** "What type of function do the data represent?" Allow time for elbow partners to discuss. Once they determine that the table represents a quadratic function, ask, "What can you do with data points (8, 0) and (12, 0)?" **Identify 8 and 12 as the x-intercepts and substitute those values for  $p$  and  $q$  in the intercept form of a quadratic function.**

## Direct Instruction

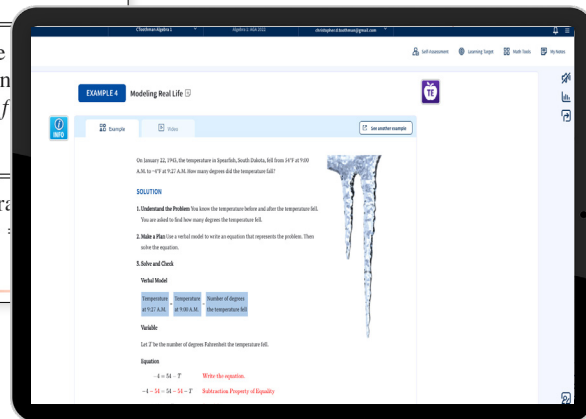
A hallmark of *Florida's B.E.S.T. Standards for MATH* is its explicit instructional guidance and carefully designed examples that follow exploration and help students build procedural fluency.



### KEY IDEA

#### Comparing Functions Using Average Rates of Change

- As  $a$  and  $b$  increase, the average rate of change between  $x = a$  and  $x = b$  of an increasing exponential function  $y = f(x)$  will eventually exceed the rate of change between  $x = a$  and  $x = b$  of an increasing quadratic function  $y = g(x)$  or an increasing linear function  $y = h(x)$ . So, as  $x$  increases,  $f(x)$  will eventually exceed  $g(x)$  or  $h(x)$ .
- As  $a$  and  $b$  increase, the average rate of change between  $x = a$  and  $x = b$  of an increasing quadratic function  $y = g(x)$  will eventually exceed the average rate of change between  $x = a$  and  $x = b$  of an increasing linear function  $y = h(x)$ . So, as  $x$  increases,  $g(x)$  will eventually exceed  $h(x)$ .



## REVIEW & REFRESH

In Exercises 50 and 51, graph the inequality in a coordinate plane.

50.  $x \geq -4$

51.  $y < 3x + 5$

In Exercises 52 and 53, evaluate the expression.

52.  $32^{2/5}$

53.  $\left(\frac{1}{49}\right)^{1/2}$

60. Use technology to find an equation of the line of best fit for the data. Then graph the equation with the data.

x	6	8	9	10	11	11	12	14
y	9	12	13	15	18	14	16	17

## Spaced Practice

Students must revisit concepts over time so deeper learning occurs. The **Review & Refresh** exercises in every lesson and at the end of every chapter provide ongoing practice so students continue to build fluency.

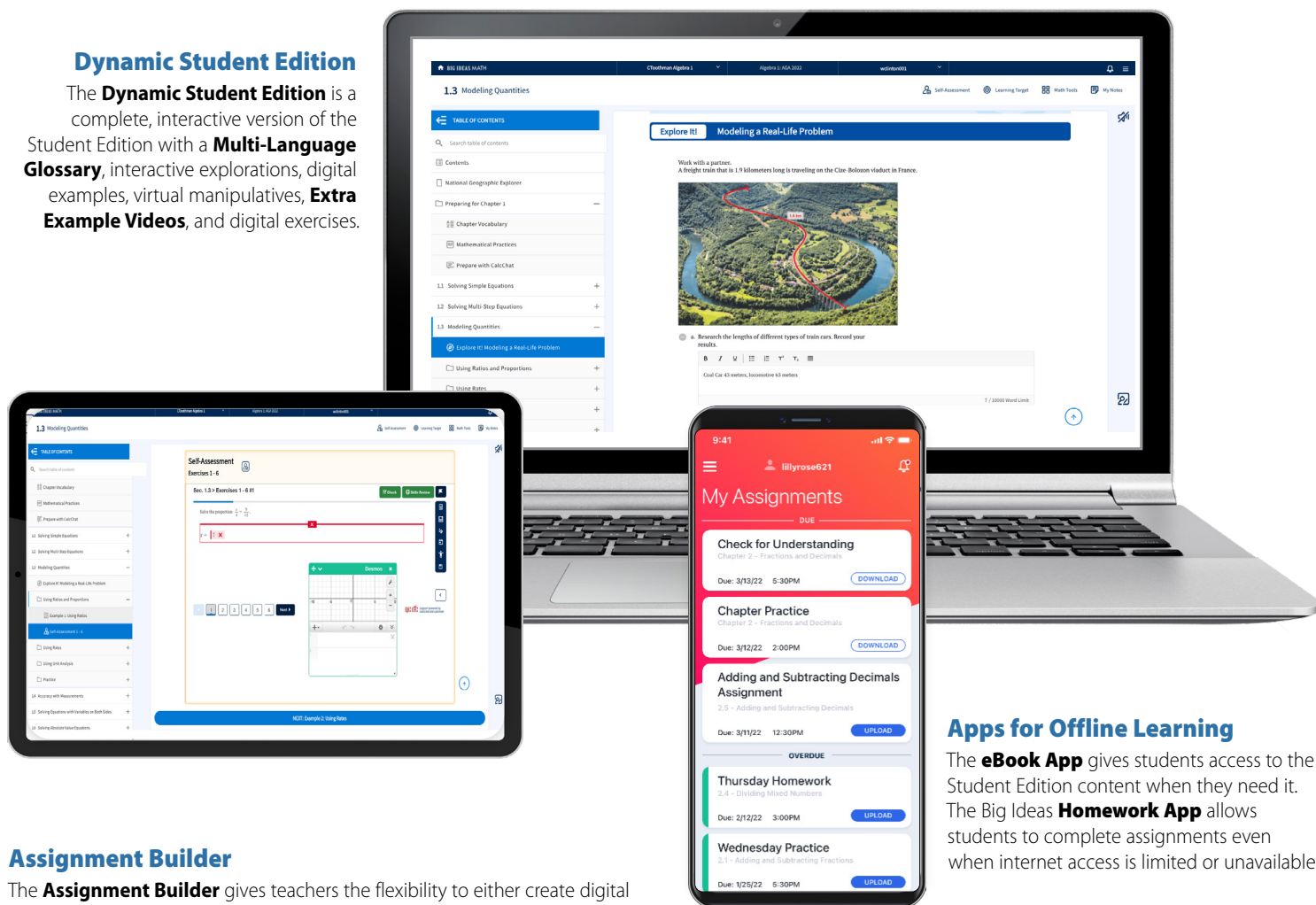
# Algebra 1, Geometry, Algebra 2

## Flexible Resources Accessible Anywhere

Engaging technology for students and teachers is the heart of the *Florida's B.E.S.T. Standards for MATH* program. The flexible online platform includes homework and assessment, interactive resources, and videos that support any learning environment. Here are just a few highlighted features of this robust digital platform.

### Dynamic Student Edition

The **Dynamic Student Edition** is a complete, interactive version of the Student Edition with a **Multi-Language Glossary**, interactive explorations, digital examples, virtual manipulatives, **Extra Example Videos**, and digital exercises.



### Apps for Offline Learning

The **eBook App** gives students access to the Student Edition content when they need it. The **Big Ideas Homework App** allows students to complete assignments even when internet access is limited or unavailable.

### Assignment Builder

The **Assignment Builder** gives teachers the flexibility to either create digital assignments and assessments that match the print resources or develop their own questions. Teachers can also select questions by B.E.S.T. benchmarks. The parity between the print and digital in the **Dynamic Student Edition** and in the **Assignment Builder** ensures teachers can provide equitable access to course content for all students. The embedded tools in the assignments provide students with optional support when they need it so that all students can be successful.

## Learn about the *entire* Digital Learning Platform!

- Complete Program Access
- Rich Assessment
- Engaging Resources
- Extra Support
- Full Accessibility
- Easy Rostering and LMS Integration



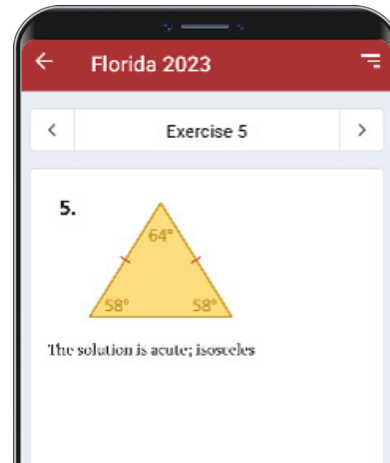
**NGL.Cengage.com/FloridaDigital**



### CalcView

Students can view stepped-out instructor videos as they work through select problems to support comprehension and the understanding of concepts.

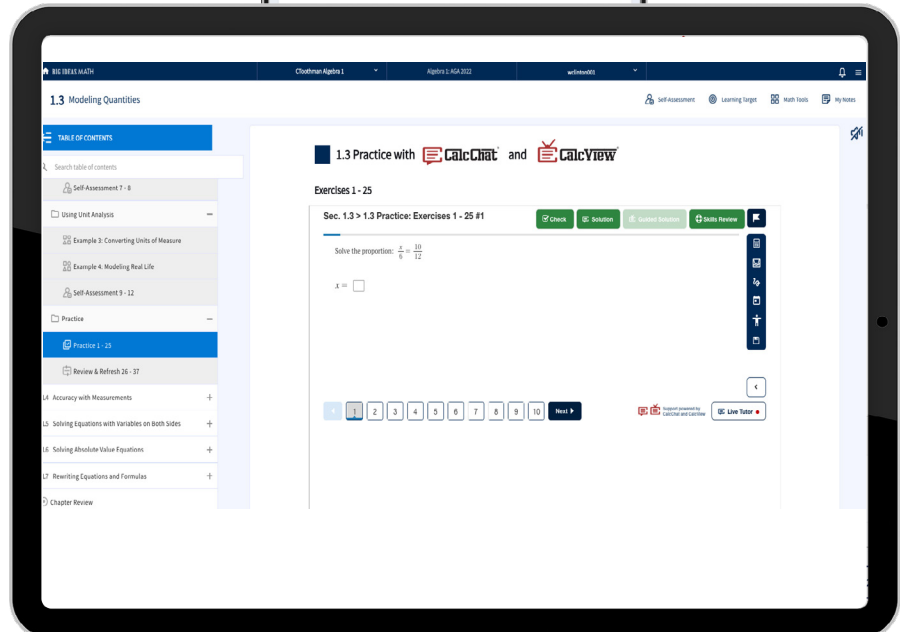
**CalcView™**



### CalcChat

Students benefit from **Worked-out Solution Videos** and live, **Virtual Tutor** support for select exercises. **Chapter Review** and **Practice Tests** are also available.

**CalcChat™**



# Algebra 1, Geometry, Algebra 2

## Support to Empower Florida Teachers

The Florida's B.E.S.T. Standards for MATH program provides teachers with everything they need to plan, teach, and assess to accelerate learning for all students. Written by master educator and author, Dr. Laurie Boswell, **Laurie's Notes** offer teachers point-of-use support through content overviews, motivation techniques, teaching strategies, questions to ask students for discussion, closures, and more!

### Plan Efficiently

Teachers can review **Laurie's Notes** in the print **Teaching Edition** or digitally in the **Dynamic Classroom**, making it easy to plan lessons at their convenience. **Laurie's Notes** also include specific support for the **Mathematical Thinking and Reasoning Standards**, so teachers can ensure students are practicing the MTRs on a daily basis.

8.7

#### Laurie's Notes

**Feedback:** "Consider increasing linear, quadratic, and exponential functions. As  $x$  increases, what happens to the values of the three functions? Listen for understanding that the value of the exponential function will eventually exceed the values of the linear and quadratic functions."

Discuss and use technology to explore these concepts for greater values of  $x$ .

- **Analyze a Problem:** Read through the problem and answer any questions students have about the language.
- Discuss choosing an appropriate level of accuracy.

**Language Support**  
Students may know the word *nest* as it applies to birds. Explain that a sea turtle also lays its eggs in a type of nest. For students with limited language, display a picture of a sea turtle nest for visual support.

**Making Math Visible**  
Use technology to help students explore the behavior of the two functions as  $x$  increases.

**KEY IDEA**  
**Comparing Functions Using Average Rates of Change**

- As  $a$  and  $b$  increase, the average rate of change between  $x = a$  and  $x = b$  of an increasing exponential function  $y = f(x)$  will eventually exceed the average rate of change between  $x = a$  and  $x = b$  of an increasing quadratic function  $y = g(x)$  or an increasing linear function  $y = h(x)$ . So, as  $x$  increases,  $f(x)$  will eventually exceed  $g(x)$  or  $h(x)$ .
- As  $a$  and  $b$  increase, the average rate of change between  $x = a$  and  $x = b$  of an increasing quadratic function  $y = g(x)$  will eventually exceed the average rate of change between  $x = a$  and  $x = b$  of an increasing linear function  $y = h(x)$ . So, as  $x$  increases,  $g(x)$  will eventually exceed  $h(x)$ .

**EXAMPLE 3 Modeling Real Life**

Each year a team of researchers counts the numbers of sea turtle nests on an island and in a coastal wildlife refuge. The function  $L(x) = 4x^2 + 72x + 1750$  represents the number of sea turtle nests counted on the island  $x$  years after 1990. In the wildlife refuge, the team counted 1275 nests in 1990 and observed that the number of nests increased by about 6% each year.

a. From 1990 to 2010, which location had a greater average rate of change?  
b. Which location will eventually have a greater number of nests? Explain.

**SOLUTION**

a. Write a function  $y = R(x)$  to model where  $x$  represents the number of years after 1990.

Island:  $L(x) = 4x^2 + 72x + 1750$   
Refuge:  $R(x) = 1275(1.06)^x$

Find the average rate of change for each location.

Island:  $\frac{L(20) - L(0)}{20 - 0} = \frac{4(20)^2 + 72(20) + 1750 - 1750}{20} = 479$   
Refuge:  $\frac{R(20) - R(0)}{20 - 0} = \frac{1275(1.06)^{20} - 1275}{20} \approx 480$

From 1990 to 2010, the average rate of change for the island is 479 nests per year and for the refuge is approximately 480 nests per year.

b. The number of nests on the island number of nests at the refuge is  $4x^2 + 72x + 1750$  and the number of nests at the refuge is  $1275(1.06)^x$ . Using technology, you can determine about equal when  $x \approx 31.5$ . So, the number of nests at the island will eventually exceed the number of nests at the refuge.

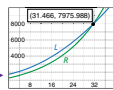
**SELF-ASSESSMENT** 1 I don't understand yet. 2 I can do it with help.

5. In Example 2, predict which network will have more members after 25 years. Explain your reasoning.

6. WHAT IF? In Example 3, suppose the initial number of nests on the island was doubled and maintained the same average rate of change. Does the number of nests at the island still eventually exceed the number of nests at the refuge? Explain.



- Five species of sea turtles are found in Florida:
- Leatherback
  - Loggerhead
  - Green Turtle
  - Kemp's Ridley
  - Hawksbill



**Answers**

5. Network B: After 25 years, the memberships of both networks are about equal and the average rate of change of Network B exceeds the average rate of change of Network A.

6. yes; The number of nests at the wildlife refuge will eventually exceed the number of nests on the island because the number of nests on the island is represented by a quadratic function and the number of nests at the refuge is represented by an exponential function.

448 Chapter 8 Graphing Quadratic Functions

448 Chapter 8

#### Honors Content

Honors content is embedded throughout the program and is clearly labeled at the beginning or within each section. Look for the **H** to easily locate Honors content.

#### EXAMPLE 1 Performing Operations on Functions

Let  $f(x) = 2x^2 - 4x + 5$  and  $g(x) = x + 1$ .

- a. Find  $(f + g)(x)$  and state the domain. Then evaluate  $(f + g)(2)$ .
- b. Find  $\left(\frac{f}{g}\right)(x)$  and state the domain. Then evaluate  $\left(\frac{f}{g}\right)(-3)$ .

**1.3 Modeling Quantities**

**Learning Target**  
Use proportional reasoning and analyze units when solving problems.

**Explore It!** Modeling a Real-Life Problem

Work with a partner.  
A freight train that is 1.9 kilometers long is traveling on a track.

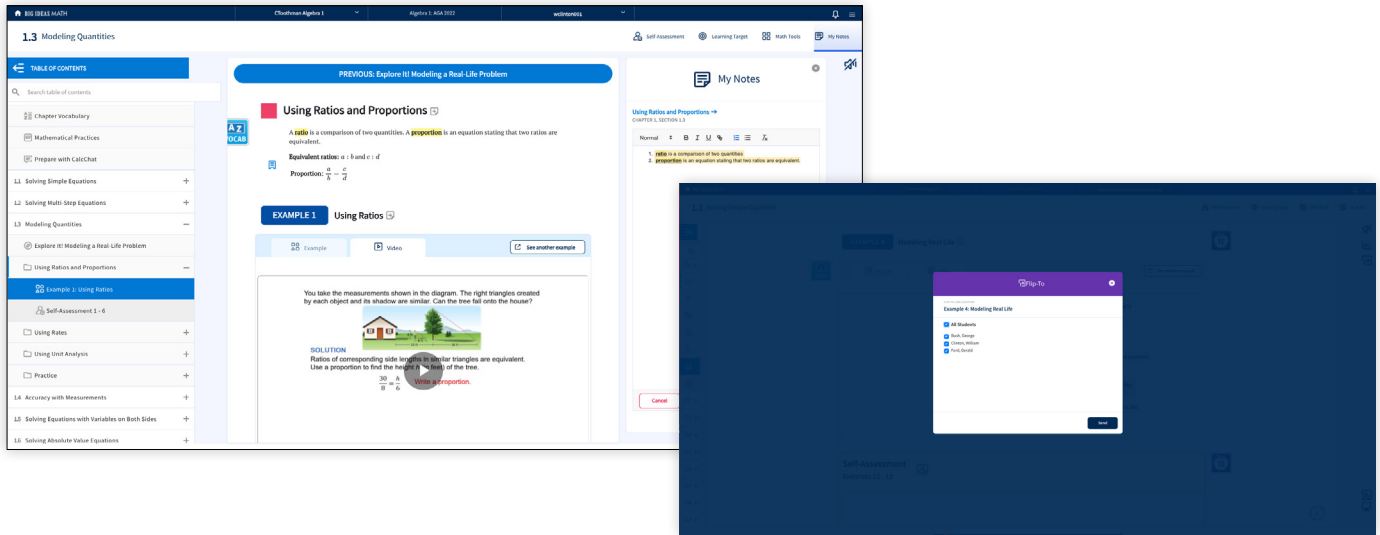
**Laurie's Notes**  
**Launch the Lesson**  
Show students a picture of a stack of the same object, such as copies of the same book. The top of the stack should not be visible.  
THINK AND TALK: "If you know the height of the stack and the height of one book, how can you estimate the number of books in the stack?" Divide the height of the stack by the height of one book.  
The exploration contains a similar problem with a different context.

**ELL SUPPORT**  
Students may know the word *rate* as a type of measure. For example, the measure of the speed of a heart beating is a heart rate. The total amount charged for fruits or vegetables is determined by their actual weight and the rate that is charged for each unit of weight. In the context of mathematics, a rate is a ratio of two quantities using different units. A rate compares two quantities.

**Laurie's Notes**  
**EXPLORE IT!**  
This is a very open-ended exploration. You can limit the range of possible answers by telling students to assume the train can be between 50 feet 5 inches and 67 feet 11 inches long.  
In this exploration, students will experience modeling a problem in which they use some of the necessary information to know (the length of the train is 1.9 kilometers). They will need to make assumptions to

## Teach Effectively

Teachers use the **Dynamic Classroom** to present lessons with engaging explorations, digital examples, and interactive practice all at their fingertips. They can even use the **Flip-To** feature to send students directly to a specific place in their **Dynamic Student Edition**.



## Assess Actively

With a variety of powerful assessment tools, teachers gain insight into actionable data, making it easier to provide all students with the exact support they need to be successful.




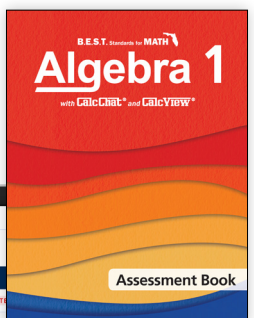
**SELF-ASSESSMENT** 1 I don't understand yet. 2 I can do it with help. 3 I can do it on my own. 4 I can teach someone else.

5. In Example 2, predict which network will have more members after 50 days. Explain your reasoning.

6. **WHAT IF?** In Example 3, suppose the initial number of nests on the island in 1990 was doubled and maintained the same average rate of change. Does the number of nests at the wildlife refuge still eventually exceed the number of nests on the island? Explain.

448 Chapter 8 Graphing Quadratic Functions


GO DIGITAL 



**Assessment Book**

STUDENT NAME	STUDENT ID	STATUS	Support Accessed	Check Answer	See an Example	Practice Skills
Anderson, Neo	2813308004	Submitted	1	2	3	4
Bennet, Ronald	2813308004	Submitted	1	2	3	4
Clark, Michael	2813308004	Submitted	22.5	8:42	✓	✓
Cole, Bryan	2813308004	Submitted	15	10:37	✓	✓
Crawford, Barbara	2813308004	In Progress	-	00:00	✓	✓

Points Possible (Click to Exclude) 1 1 1 1

Resources 

# Algebra 1, Geometry, Algebra 2

## Robust Assessment for B.E.S.T. Success

The robust assessment suite allows teachers to assess students diagnostically, formatively, or summatively, in print or digitally with the **Assignment Builder**. The assessments give teachers clear insight into student progress on the B.E.S.T. Standards, helping make data-driven instructional decisions to meet the unique needs of every student and accelerate their learning.

Name \_\_\_\_\_ Date \_\_\_\_\_

**Algebra 1 Pre-Course Test**

- The letters  $a$  and  $b$  represent nonzero constants. Solve  $ax + b = 56$  for  $x$ .
- Your mom buys a used car marked with the list price of \$11,995. The salesperson gives her a \$475 discount off the list price. She pays 8% in sales tax and \$510 in additional fees. How much does your mom pay for the car?
- Solve  $|4x - 6| - 10 = 16$ .
- Write "a number  $b$  minus 6.7 is at most 9" as an inequality.

Solve the inequality. Graph the solution.

5.  $\frac{x}{3} - 1 < 3$

6.  $9x - 7 \leq 7x + 9$

7.  $-17 < 2x - 5 \leq -7$

8. Find the domain and range of the function represented by the graph.

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**Preparing for Chapter 8**

**Chapter Learning Target:** Understand graphing quadratic functions.

**Chapter Success Criteria:**

- I can identify characteristics of quadratic functions.
- I can describe how to graph quadratic functions in different forms.
- I can find zeros of functions using intercept form.
- I can choose an appropriate function to model data.

**Chapter Vocabulary**

Work with a partner. Discuss each of the vocabulary terms.

vertex zero of a function minimum value  
axis of symmetry maximum value average rate of change

**Mathematical Thinking and Reasoning**

**ENGAGE IN DISCUSSIONS THAT REFLECT ON THE MATHEMATICAL THINKING OF SELF AND OTHERS**  
Mathematicians who engage in discussions that reflect on the mathematical thinking of self and others communicate mathematical ideas, vocabulary, and methods effectively.

Work with a partner. The graphs of three different parent functions are shown.

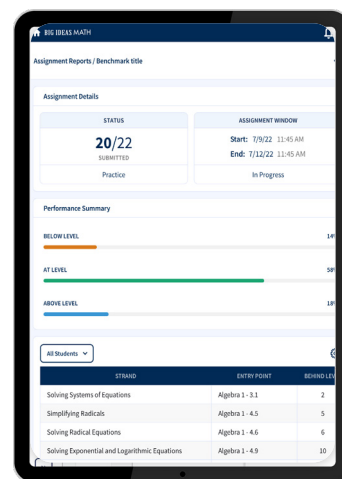
linear function absolute value function quadratic function

1. For each case below, describe the effect of  $n$  on the graph of the parent linear and absolute value functions. Then make an argument about the effects of  $n$  on the graph of the parent quadratic function. Explain your reasoning.

$n \cdot f(x)$   $f(nx)$   $f(x - n)$   $f(x) + n$

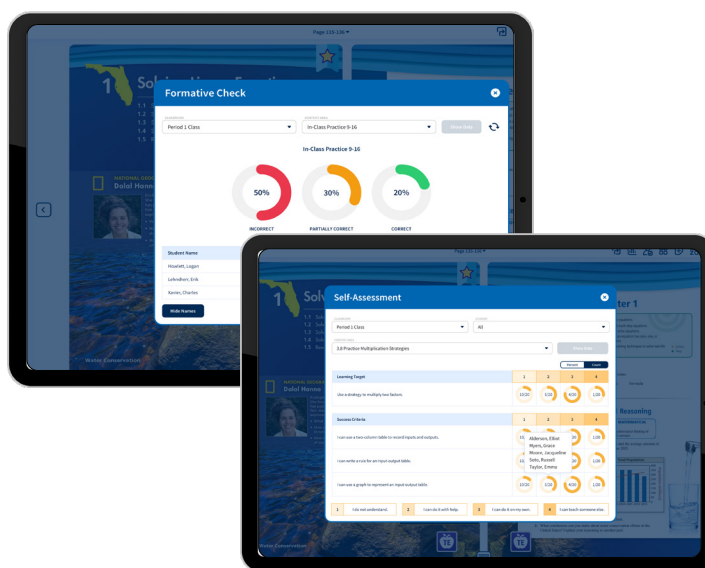
2. Use technology to graph each of the following quadratic functions. Do the results support your argument? Explain.

$y = 3x^2$   $y = \left(\frac{1}{3}\right)x^2$   $y = (x - 5)^2$   $y = x^2 + 1$   
 $y = \frac{1}{2}x^2$   $y = (2x)^2$   $y = (x + 4)^2$   $y = x^2 - 6$



### Progression Benchmark Test

Customized for the Florida benchmarks, student learning can be measured across grades with the adaptive **Progression Benchmark Test**, which shows teachers where their students are in the progression of FL strands.



### Diagnostic Assessment

Teachers can diagnostically assess students at the beginning of the year using the **Prerequisite Skills Practice with Item Analysis** or use the **Pre-Course Test** as a baseline to show growth throughout the year. Then, before each chapter, teachers can use the **Prepare** feature to get students ready for upcoming chapter content.

### Formative Check and Self-Assessment

Teachers can assess students using the **Formative Check** and encourage students to use the **Self-Assessment**. Both tools provide data and insight into student progress, as well as how the students see their own learning progressing as they rate themselves on the success criteria.

## 8.8 Modeling with Quadratic Functions

### Assignment Guide

- Use the results from the **exercises** to provide differentiated support for all learners.
- Assign Review & Refresh exercises as appropriate for continued spaced practice.
- Review & Refresh Exercise 34 contains honors content.

Exercise	Emerging	Precipient	Advanced	DOK 1	DOK 2	DOK 3
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						

### ANSWER PRESENTATION TOOL

Grade 8 Student Edition

1. Use the rectangles to find the factor pairs for 21.

2. Draw rectangles to find the factor pairs for 21.

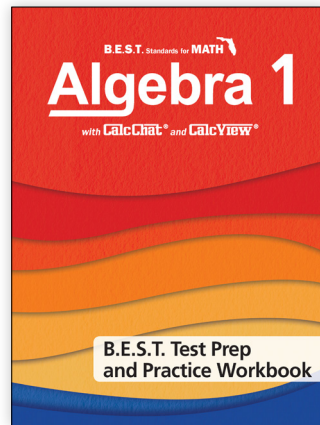
3. 13

## Assignment Guide

The **Assignment Guide** allows teachers to differentiate assignments for students based on where they are in their learning. Teachers can assign in print or digitally, and then use the **Answer Presentation Tool** to review with students..

## B.E.S.T. Test Prep and Practice Workbook

The **B.E.S.T. Test Prep and Practice Workbook** (Algebra 1 and Geometry) prepares students for cumulative standardized tests, in addition to helping students self-assess their understanding of the Learning Targets and Success Criteria. It also contains **Evidence-Based Scale Worksheets**, which allow teachers to assess each benchmark on a 1–4 scale and make instructional decisions. For on-level or Honors Algebra 2 students, the **Test Prep and Practice Workbook** supports students as they prepare for SAT and ACT exams.



### Chapter 8 B.E.S.T. Test Prep

1. Which graph represents the function  $g(x) = \frac{1}{4}x^2 + 2$ ?

2. Let  $h(x) = -\frac{1}{3}x - 4$ . What is the value of  $h$  at  $x = -3$  and at  $x = 17$ ?

3. Consider the graph of the function  $f$ . Select all the true statements.

4. Graph  $g(x) = -2x^2 - 2$ .

5. Graph  $g(x) = -4(x + 1)^2 - 2$ .

6. Graph  $g(x) = -x^2 - 3x + 4$ .

7. Write a quadratic function in standard form that models the data.

x	-2	-1	0	1	2
f(x)	-42	0	-24	0	6

### Evidence-Based Scale Worksheet

Number Sense and Operations

MA.912.NSO.1.4 Extend previous understanding of the Laws of Exponents to include rational exponents. Apply the Laws of Exponents to evaluate numerical expressions and generate equivalent numerical expressions involving rational exponents.

Circle the scale that best demonstrates your knowledge of the standard.

Description	Evidence
4 I can go beyond the standard.	<ul style="list-style-type: none"> <li>Teach someone else how to rewrite radicals as rational exponents and simplify the radical completely.</li> </ul>
3 I understand the entire standard.	<ul style="list-style-type: none"> <li>Evaluate expressions involving radicals using rational exponents.</li> </ul>

## Summative Assessments

**Quizzes, Tests, and Course Benchmark Tests** from the **Assessment Book** assess course content, and can be assigned periodically throughout the year. These tests are customizable in print and online!

### Activity Library

What would you like to create?

- Practice
- Assessment
- Progression Benchmark
- Course

Section 1.1 Self-Assessment (1–4) (Copy)

Pre-Course Test

Post-Course Test

Chapter 8 Chapter Review (1–4)

Chapter 8 Chapter Review (1–14)

Chapter 8 Chapter Review (21–22)

Chapter 8 Chapter Review (23–30)

Chapter 8 Chapter Review (31–38)

Chapter 8 Chapter Review (39–40)

Chapter 8 Chapter Review (41–42)

Chapter 8 Chapter Review (7–12)

### Chapter 8 Test A

1. Identify characteristics of the quadratic function and its graph.

2. Graph  $g(x) = 3x^2$ .

3. Graph  $g(x) = -2x^2 - 2$ .

4. Graph  $g(x) = -2x^2 - 8x - 11$ .

5. Graph  $g(x) = -4(x + 1)^2 - 2$ .

6. Graph  $g(x) = -x^2 - 3x + 4$ .

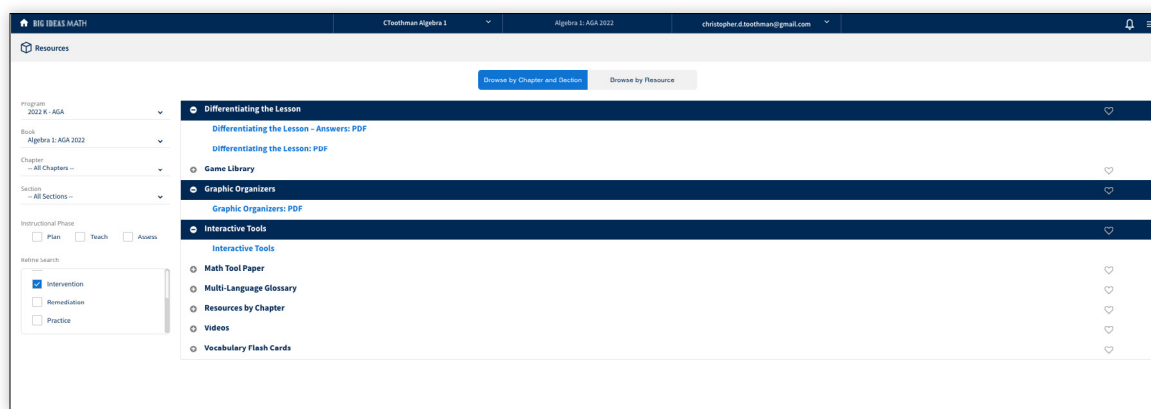
7. Write a quadratic function in standard form that models the data.

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f(x)	-42	0	-24	0	6

# Algebra 1, Geometry, Algebra 2

## Reach All Florida Learners

Florida's *B.E.S.T. Standards for MATH* supports Florida teachers and provides guidance on how to accommodate students' diverse learning styles and abilities. Students feel empowered to address their own gaps in knowledge and extend their understanding of key concepts.

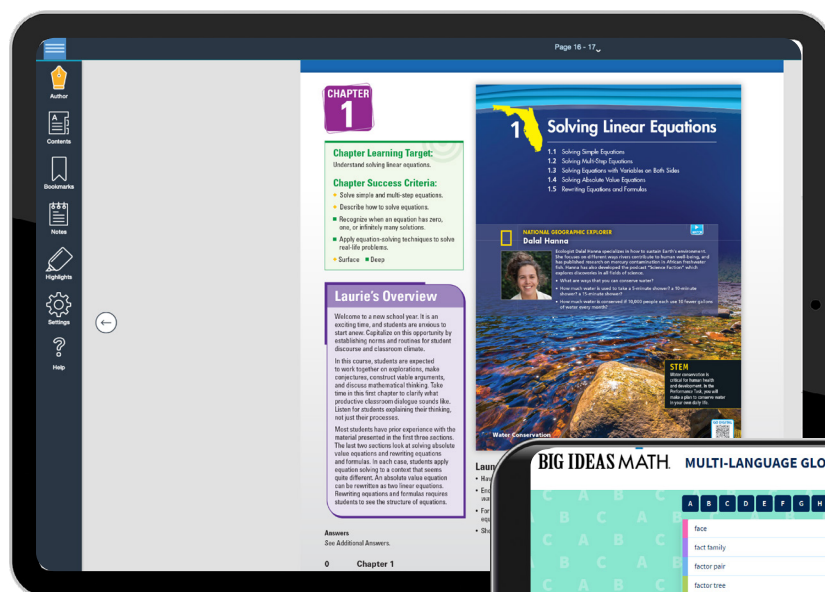


### Built-in Differentiation Strategies

The **Teaching Edition** provides alternative teaching strategies to support emerging, proficient, and advanced learners. Supports such as **Reteach, Extra Practice,** and **Enrichment and Extension** fortify students' understanding and fluency.

### Timely Intervention Support

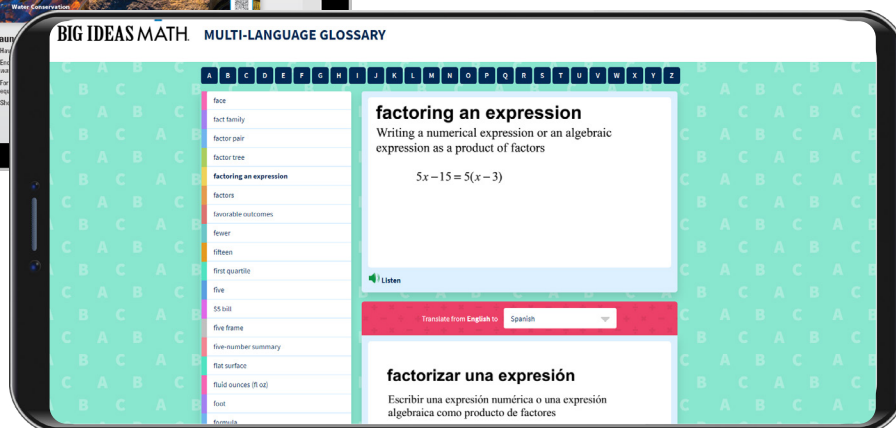
Teachers have access to resources for the entire K–12 program to support RTI tiers at any time. These resources are editable to customize assignments and include **Alternative Assessments, Extra Practice, Skills Review Handbook,** and more.



### ELL Support and Development

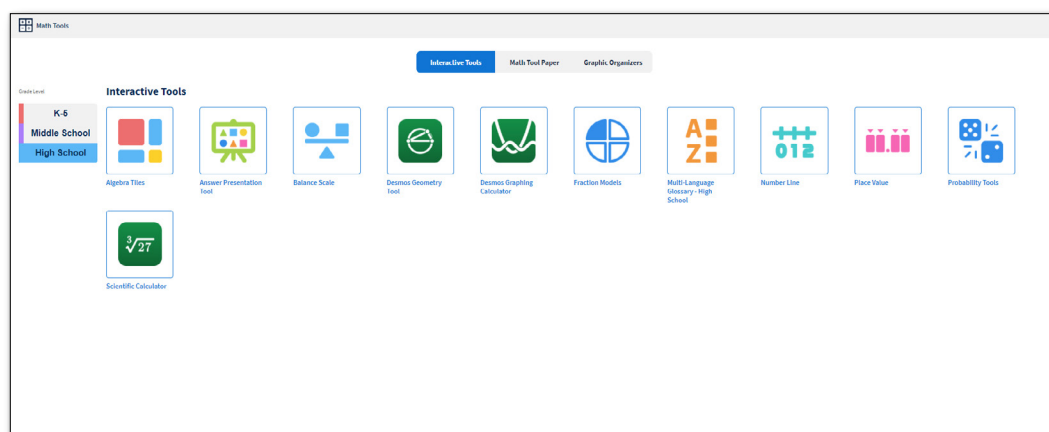
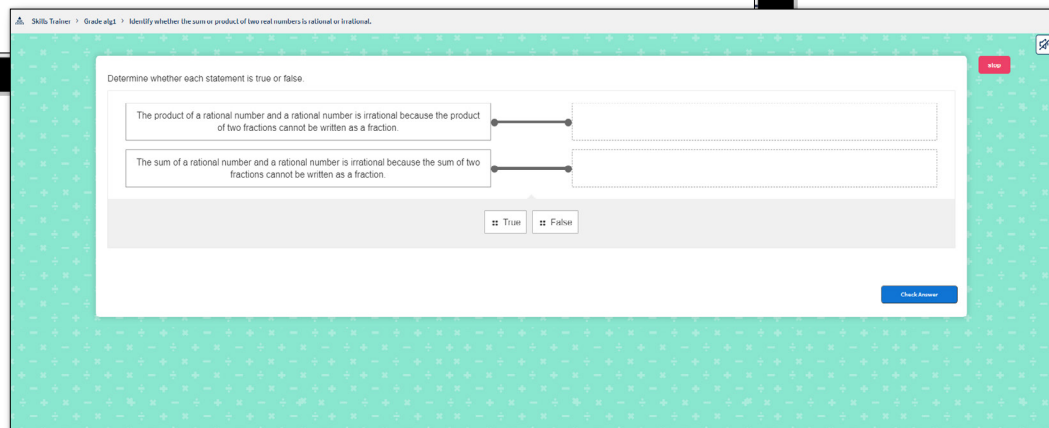
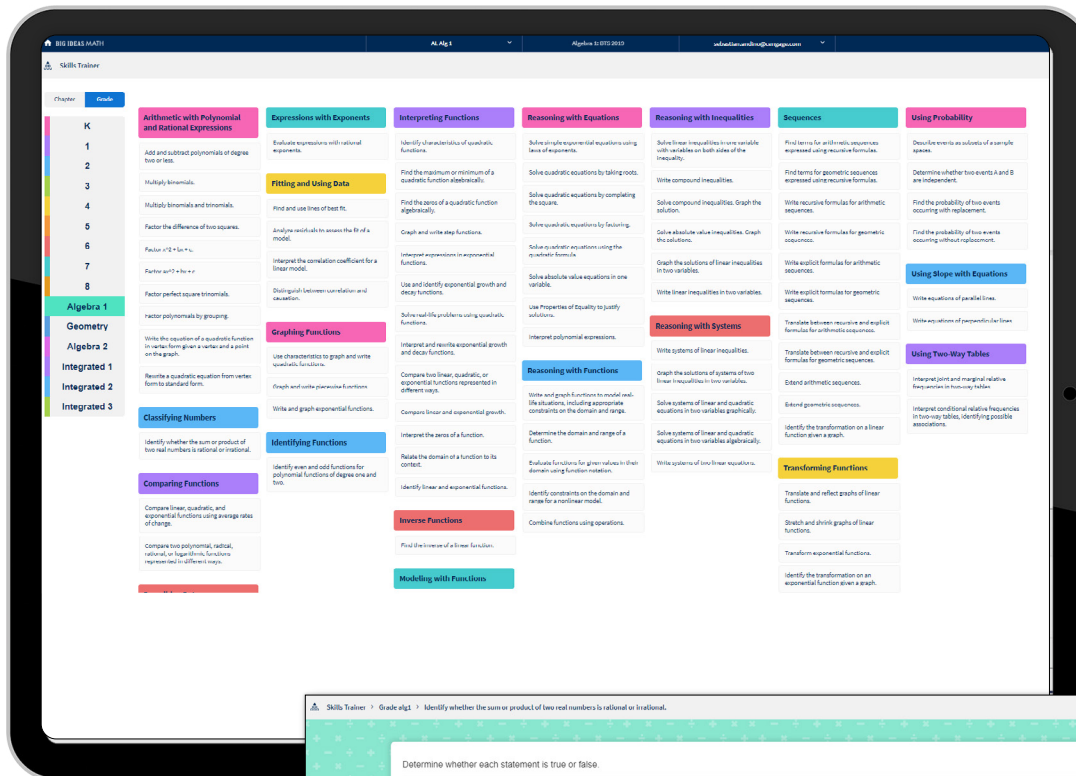
Support for ELL students includes **Vocabulary Review** and **Leveled Proficiency Comprehension**. These features target Beginner, Intermediate, and Advanced ELLs, which correspond to **WIDA** reading, writing, speaking, and language mastery levels.

The **Multi-Language Glossary** is accessible via the **Dynamic Classroom** and supports over **16 total languages** by providing translations of key vocabulary terms.



## Digital Opportunities for Reinforcement and Enrichment

Florida's B.E.S.T. Standards for MATH offers a variety of digital resources for skill development, review, and enrichment. The **Skills Trainer** provides opportunities for students to review or extend skills from Grade K through Algebra 2. **Interactive Tools** such as algebra tiles, number lines, and fraction models help students make connections by visualizing key concepts.



# Algebra 1, Geometry, Algebra 2

## Ensure Success for Spanish-Speaking Students

Florida's *B.E.S.T. Standards for MATH* offers students and teachers a blend of print and digital resources for Spanish language support.

The Spanish Student Edition, in both print and digital, is a carefully developed translation of the complete student program. In addition, a full assessment suite in Spanish ensures formative and summative assessment can be delivered effectively.

### English Language Learner Support **ELL**

#### Vocabulary Review

Write the term *axis of symmetry* on the board. Ask students if they know what *axis* means in everyday language. Compare it to the word *axle*, which names the center rod around which a wheel spins. Then ask students if they know what *symmetry* means. To demonstrate symmetry, fold a piece of paper in half and cut out a shape around the center fold. Explain that an axis of symmetry is a line that divides a parabola into two symmetric parts, similar to the fold in the paper shape.

#### Leveled Proficiency Comprehension

To provide language practice, allow students to work in pairs on Self-Assessment Exercises 1 and 2. Have one student ask the other, "What is the vertex? axis of symmetry? domain? range?" Have students switch asking and answering for Exercise 2. Expect students to perform according to their language levels.

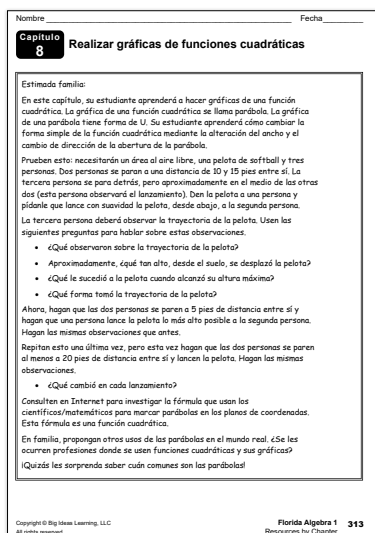
**Beginning Level:** Students may write answers and point to characteristics of the graphs.

**Intermediate Level:** Students may use phrases to provide answers.

**Advanced Level:** Students may use detailed sentences to provide answers.

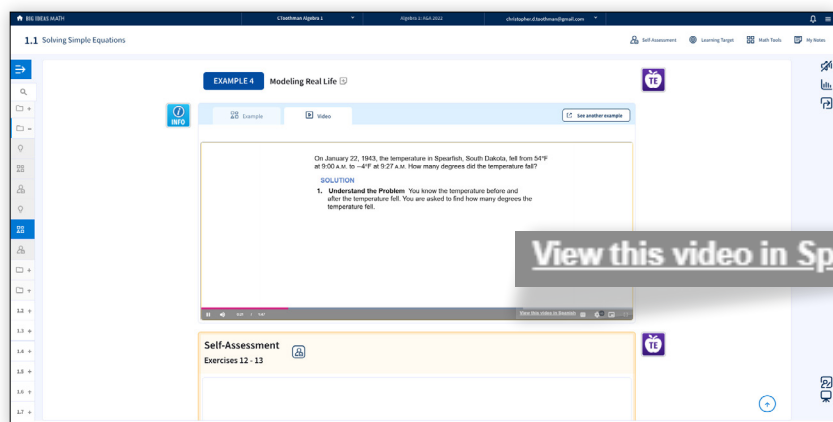
### Teaching Edition

Built-in support through **Laurie's Notes** in the **Teaching Edition** provides teaching strategies for ELL students, including Spanish speakers.



### At-Home Connections

The **Game Library** provides **Spanish audio** and translated PDFs to help with engagement in class and at home. With **Family Letters**, parents and caregivers can help make real-world and at-home connections to develop language and mathematical skills.



### Digital Language Support

**Spanish audio** is also available in the **Dynamic Classroom** to enhance **Digital Examples**, **Extra Example Videos**, practice, assessments, and more.

# B.E.S.T. Program Resources

Florida's *B.E.S.T. Standards for MATH* ensures that students and teachers have access to all materials on a single digital platform or in easily accessible print resources.

## Print Student Resources

(Also available Online)

### Student Edition

#### B.E.S.T. Test Prep and Practice Workbook\*\*

Review & Refresh\*  
 B.E.S.T. Test Prep\*  
 Self-Assessment\*  
 Chapter Self-Assessment\*  
 Post-Course Test\*  
 Evidence-Based Scale Worksheets\*

## Digital Student Resources

### Dynamic Student Edition

Interactive Tools  
 Everyday Explorations with National Geographic Explorers  
 Interactive Explorations  
 Digital Examples  
 Extra Example Videos  
 Self-Assessments

### Additional Resources

Vocabulary Flashcards\*  
 Graphic Organizers  
 Math Tool Paper

### Skills Trainer

### Game Library\*

### Multi-Language Glossary\*

### STEAM Videos♦

### eBook App

### Homework App

### CalcChat and CalcView

## Print Teacher Resources

(Also available Online)

### Teaching Edition

#### Resources by Chapter

Family Letter\*  
 Warm-Ups  
 Extra Practice  
 Reteach  
 Enrichment and Extension  
 Chapter Self-Assessment  
 Puzzle Time

### Assessment Book

Prerequisite Skills Practice\*  
 Pre- and Post-Course Tests\*  
 Course Benchmark Tests\*  
 Quizzes\*  
 Chapter Tests\*  
 Alternative Assessments\*  
 Performance Tasks\*

## Digital Teacher Resources

### Dynamic Classroom

Laurie's Notes  
 Interactive Tools  
 Interactive Explorations  
 Digital Examples with PowerPoints  
 Formative Check  
 Self-Assessment  
 Flip-To  
 Digital Warm-Ups and Closures  
 Mini-Assessments

### Dynamic Assessment System

Practice  
 Assessments  
 Progression Benchmark Tests  
 Performance and Standard Reports

### Answer Presentation Tool

### Additional Resources

Cross-Curricular Projects  
 Lesson Plans  
 Pacing Guides  
 Differentiating the Lesson  
 Worked-Out Solutions Key  
 Family Letters\*

### Video Support for Teachers

Everyday Connections Videos  
 Professional Development Videos  
 Concepts and Tools Videos

\*Available online in Spanish

\*\*Test Prep and Practice Workbook for Algebra 2

## Coherent Progressions for Florida from Grades K-12

Florida's B.E.S.T. Standards for MATH is completely aligned with the Florida B.E.S.T. standards and provides students and teachers with meaningful coherence from Kindergarten through Algebra 2. Both print and digital resources are designed to support all Florida learners and encourage students to become strategic thinkers and problem solvers.

A complete program for every curriculum pathway in Florida!

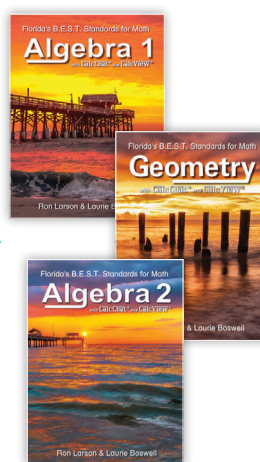
### Florida Math for Grades K-5



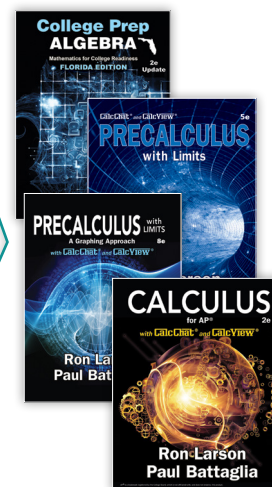
### Florida Math for Grades 6-8



### Florida Math for Algebra 1, Geometry, Algebra 2

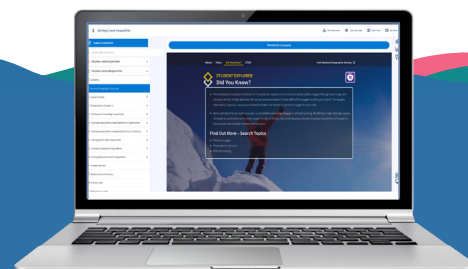


### Florida Math for College Algebra, Precalculus, AP® Calculus



Reviewing the program?

Go to [BigIdeasLearning.com/FloridaReview](https://BigIdeasLearning.com/FloridaReview)



For Blended, Print, or Digital Delivery!