FLORIDA'S

B.E.S.T. Standards for MATH

Algebra 1

with CalcChat® and CalcView®

Volume 1

TEACHING EDITION

Ron Larson
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A Single Authorship Team

Written by renowned authors, Dr. Ron Larson and Dr. Laurie Boswell, *Florida's B.E.S.T. Standards for MATH* offers a seamless math pedagogy from Kindergarten through Algebra 2. Together, Ron and Laurie provide a consistent voice that encourages students to make connections through cohesive progressions and clear instruction. Since 1992, Ron and Laurie have authored over 50 mathematics programs.

Each time Laurie and I start working on a new program, we spend time putting ourselves in the position of the reader. How old is the reader? What is the reader's experience with mathematics? The answers to these questions become our writing guides. Our goal is to make the learning targets understandable and to develop these targets in a clear path that leads to student success.

Ron Larson

Ron Larson, Ph.D., is well known as lead author of a comprehensive and widely used mathematics program that ranges from elementary school through college. He holds the distinction of Professor Emeritus from Penn State Erie, The Behrend College, where he taught for nearly 40 years. He received his Ph.D. in mathematics from the University of Colorado. Dr. Larson engages in the latest research and advancements in mathematics education and consistently incorporates key pedagogical elements to ensure focus, coherence, rigor, and student self-reflection.

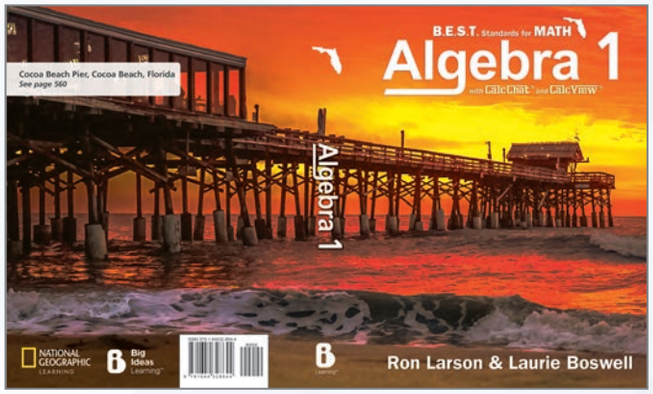
My passion and goal in writing is to provide an essential resource for exploring and making sense of mathematics. Our program is guided by research around the learning and teaching of mathematics in the hopes of improving the achievement of all students. May this be a successful year for you!

Laurie Boswell

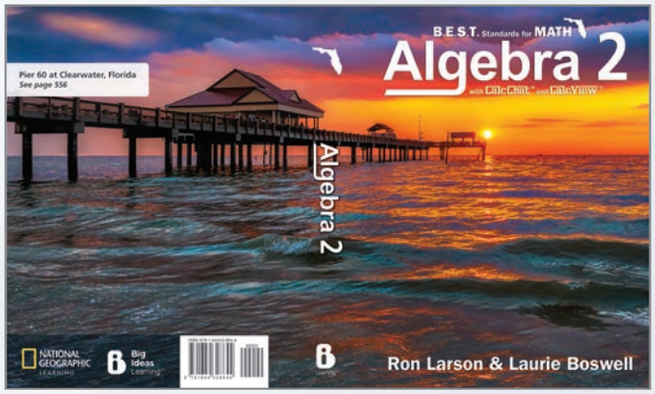
Laurie Boswell, Ed.D., is the former Head of School at Riverside School in Lyndonville, Vermont. In addition to authoring textbooks, she provides mathematics consulting and embedded coaching sessions. Dr. Boswell received her Ed.D. from the University of Vermont in 2010. She is a recipient of the Presidential Award for Excellence in Mathematics Teaching and later served as president of CPAM. Laurie has taught math to students at all levels, elementary through college. In addition, Laurie has served on the NCTM Board of Directors and as a Regional Director for NCSM. Along with Ron, Laurie has co-authored numerous math programs and has become a popular national speaker.

A Program Built for Florida

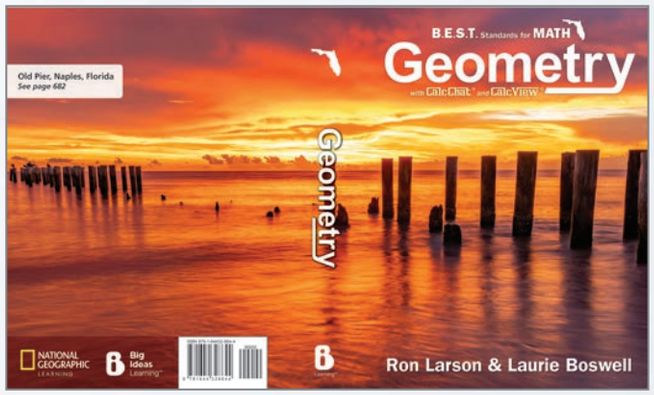
Florida Landmarks



Cocoa Beach Pier, Cocoa Beach, Florida



Pier 60, Clearwater, Florida



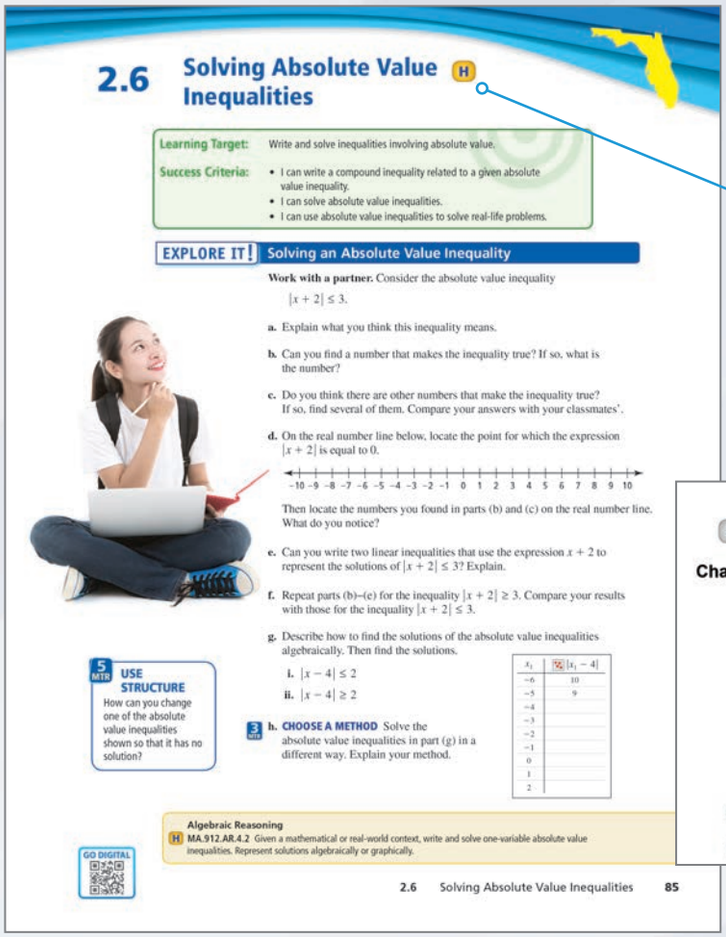
Old Pier, Naples, Florida

Opportunities for Deeper Thinking

Course Project

One of the course projects suggested at the end of this book is related to the Florida landmark on the cover. Students can choose to study the mathematics of waves at Cocoa Beach, or an environmental issue related to the coastal region, or any other topic of interest to them. Several topics are suggested. Students should work on the project throughout the course as they investigate, explore, and analyze the world around them.

Embedded Florida Honors Content



2.6 Solving Absolute Value Inequalities (H)

Learning Target: Write and solve inequalities involving absolute value.

Success Criteria:
- I can write a compound inequality related to a given absolute value inequality.
- I can solve absolute value inequalities.
- I can use absolute value inequalities to solve real-life problems.

EXPLORE IT! Solving an Absolute Value Inequality

Work with a partner. Consider the absolute value inequality

$|x + 2| \leq 3$.

a. Explain what you think this inequality means.

b. Can you find a number that makes the inequality true? If so, what is the number?

c. Do you think there are other numbers that make the inequality true? If so, find several of them. Compare your answers with your classmates'.

d. On the real number line below, locate the point for which the expression $|x + 2|$ is equal to 0.

−10 −9 −8 −7 −6 −5 −4 −3 −2 −1 0 1 2 3 4 5 6 7 8 9 10

Then locate the numbers you found in parts (b) and (c) on the real number line. What do you notice?

e. Can you write two linear inequalities that use the expression $x + 2$ to represent the solutions of $|x + 2| \leq 3$? Explain.

f. Repeat parts (b)–(e) for the inequality $|x + 2| \geq 3$. Compare your results with those for the inequality $|x + 2| \leq 3$.

g. Describe how to find the solutions of the absolute value inequalities algebraically. Then find the solutions.

i. $|x - 4| \leq 2$

ii. $|x - 4| \geq 2$

x_1	$\|x_1 - 4\|$
−6	10
−5	9
−4	
−3	
−2	
−1	
0	
1	
2	

5 MIN **USE STRUCTURE** How can you change one of the absolute value inequalities shown so that it has no solution?

3 MIN h. **CHOOSE A METHOD** Solve the absolute value inequalities in part (g) in a different way. Explain your method.

Algebraic Reasoning
(H) MA.912.AR.4.2 Given a mathematical or real-world context, write and solve one-variable absolute value inequalities. Represent solutions algebraically or graphically.

GO DIGITAL

2.6 Solving Absolute Value Inequalities 85

Throughout this program, look for (H) to denote honors content. This icon may appear at the beginning of a section or within a section.

Dig Deeper

1. You and your friend run at constant rates. The linear function $d = 8t$ represents the distance d (in feet) that you run in t seconds. The table shows the distance that your friend runs over time.

Time (seconds), t	Distance (feet), d
20	170
40	340
60	510

a. Does the table re

b. Who is running a

Dig Deeper

1. Write a quadratic function represented by the table, if possible. If not, explain why.

x	−3	4	10	15
y	6	0	0	6

Dig Deeper

Students can go deeper in their thinking on every topic by accessing *Dig Deeper* problems online. These problems allow students to work with more complex and interconnected ideas to achieve deeper understanding of conceptual themes throughout the course. These additional higher order thinking problems are available for every section.

Research, Contributors, and Reviewers

Research

Ron Larson and Laurie Boswell used the latest in educational research, along with the body of knowledge collected from expert mathematics educators, to develop the *Florida's B.E.S.T. Standards for MATH* series. The pedagogical approach used in this program follows the best practices outlined in the most prominent and widely accepted educational research, including:

- *B.E.S.T. Standards for Mathematics*, Florida Department of Education ©2020
- *Visible Learning*, John Hattie ©2009
- *Visible Learning for Mathematics*
  John Hattie ©2017
- *Visible Learning Feedback*
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- *Teaching Mathematics in the Visible Learning Classroom, High School*
  John Almarode, Douglas Fisher, Joseph Assof, John Hattie, and Nancy Frey ©2018
- T*he Teacher Clarity Playbook, Grades K–12*
  Douglas Fisher, Nancy Frey, Olivia Amador, and John Hattie ©2018
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- *Unlocking Formative Assessment: Practical Strategies for Enhancing Students' Learning in the Primary and Intermediate Classroom*
  Shirley Clarke, Helen Timperley, and John Hattie ©2004
- *Formative Assessment in the Secondary Classroom*
  Shirley Clarke ©2005
- *Improving Student Achievement: A Practical Guide to Assessment for Learning*
  Toni Glasson ©2009

Contributing Specialists and Reviewers

Big Ideas Learning would like to express our gratitude to the mathematics education and instruction experts from Florida who served as our advisory panel, in addition to all the contributing specialists and reviewers who played a key role during the writing of *Florida's B.E.S.T. Standards for MATH*. Their input was an invaluable asset during the development of this program.

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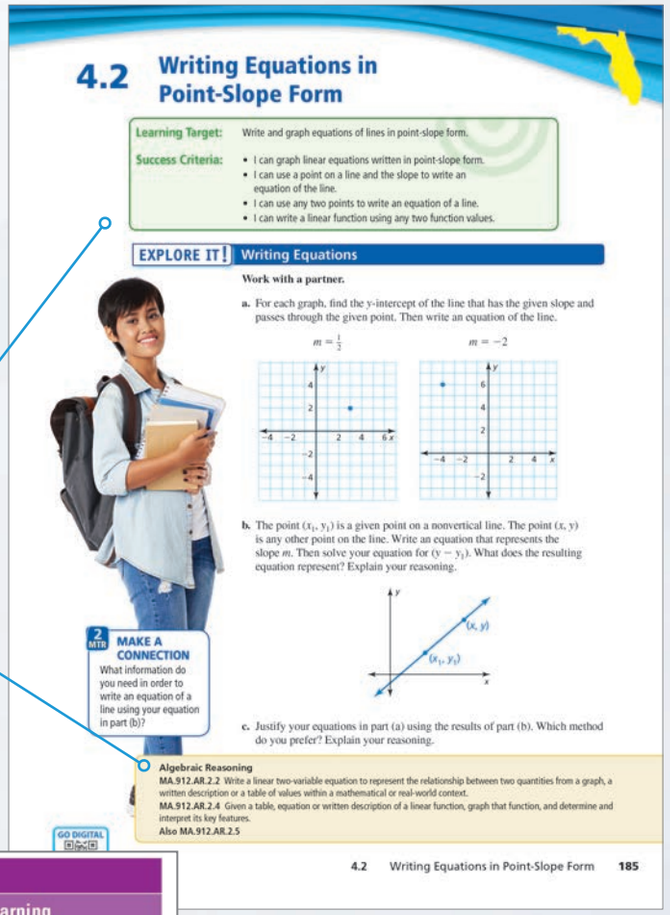
  Content Reviewer

Instructional Design

A single authorship team from Kindergarten through Algebra 2 results in a logical progression of focused topics with thoughtful coherence and rigor throughout the curriculum.

FOCUS

Focused on Florida's *B.E.S.T. Standards for Mathematics*, each section displays the precise language of Florida benchmarks, making the expectations clear. Learning Targets and Success Criteria are aligned to those expectations.



4.2 Writing Equations in Point-Slope Form

Learning Target: Write and graph equations of lines in point-slope form.

Success Criteria:
- I can graph linear equations written in point-slope form.
- I can use a point on a line and the slope to write an equation of the line.
- I can use any two points to write an equation of a line.
- I can write a linear function using any two function values.

EXPLORE IT! Writing Equations

Work with a partner.

a. For each graph, find the y-intercept of the line that has the given slope and passes through the given point. Then write an equation of the line.

$m = \frac{1}{2}$ $m = -2$

b. The point (x_1, y_1) is a given point on a nonvertical line. The point (x, y) is any other point on the line. Write an equation that represents the slope m. Then solve your equation for $(y - y_1)$. What does the resulting equation represent? Explain your reasoning.

MAKE A CONNECTION
What information do you need in order to write an equation of a line using your equation in part (b)?

c. Justify your equations in part (a) using the results of part (b). Which method do you prefer? Explain your reasoning.

Algebraic Reasoning
MA.912.AR.2.2 Write a linear two-variable equation to represent the relationship between two quantities from a graph, a written description or a table of values within a mathematical or real-world context.
MA.912.AR.2.4 Given a table, equation or written description of a linear function, graph that function, and determine and interpret its key features.
Also MA.912.AR.2.5

4.2 Writing Equations in Point-Slope Form 185

Florida benchmarks are shown at the beginning of each section, with a related **Learning Target** and **Success Criteria** to guide student learning.

COHERENCE Through the Grades

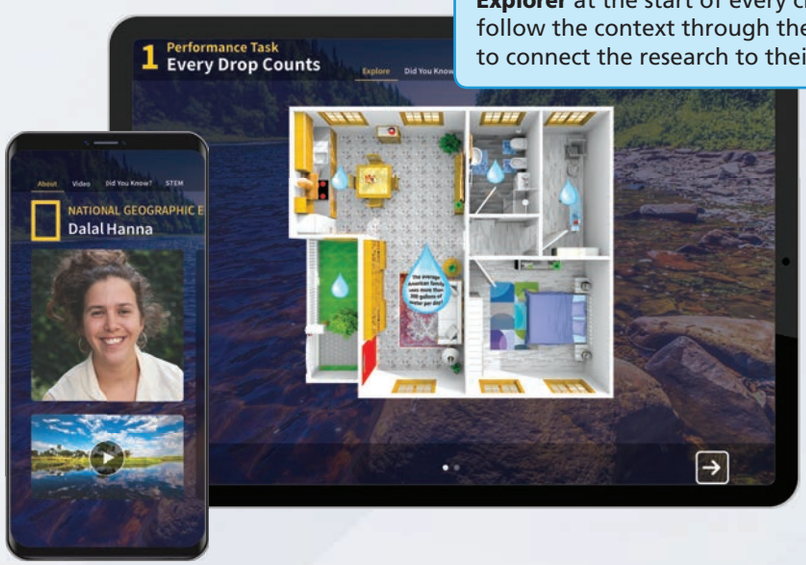
Prior Learning	Current Learning	Future Learning
Middle School • **MA.8.GR.2.3** Describe and apply translations, reflections, rotations, and dilations using coordinates and the coordinate plane. • **MA.8.AR.3.4** Graph linear equations. • **MA.8.AR.3.2, MA.8.AR.3.5** Find and interpret the slope and y-intercept of a line. • **MA.8.F.1.1** Determine whether a relation is a function. Find the domain and range of a relation. • **MA.8.F.1.2** Recognize linear functions represented as tables, equations, and graphs. • **MA.8.F.1.3** Describe relationships between quantities in graphs. Sketch graphs given	**Chapter 3** • **MA.912.AR.2.5** Understand the concept of a function. Find the domain and range of a function. • **MA.912.AR.2.4, MA.912.AR.2.5, MA.912.AR.3.7, MA.912.AR.3.8** Describe characteristics of functions. • **MA.912.AR.2.4** Sketch a graph of a function from a verbal description. • **MA.912.F.1.6** Compare key features of linear and nonlinear functions. • **MA.912.AR.2.4, MA.912.AR.2.5** Graph linear functions and interpret key features of the graphs. • **MA.912.F.1.1** Identify linear functions using graphs, tables, and equations.	**Algebra 1** • **MA.912.AR.2.2** Write equations of lines in slope-intercept, point-slope, and standard form. • **MA.912.AR.9.1** Write a linear equations by gra • **MA.912.AR.2.1** Solve l graphing. • **MA.912.AR.2.8** Graph linear inequality in two • **MA.912.AR.9.4** Graph system of linear inequa • **MA.912.F.1.1** Distinguish exponential functions. • **MA.912.AR.5.6** Graph exponential functions

Every chapter is written to follow the progressions built into the Florida benchmarks. The **Progressions** show how content progresses from grade to grade. These Algebra 1 standards, on functions, build on the foundational work with equations and graphs from middle school.

COHERENCE

The sequence of topics, from Kindergarten to Algebra 2, follows the benchmarks and clarifications for each grade and progresses meaningfully within each grade and between grade levels.

from a Single Authorship Team

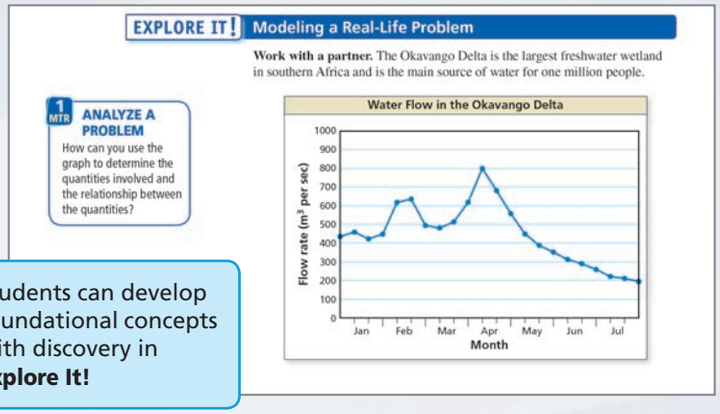


Students meet a **National Geographic Explorer** at the start of every chapter and follow the context through the chapter to connect the research to their learning.

RIGOR

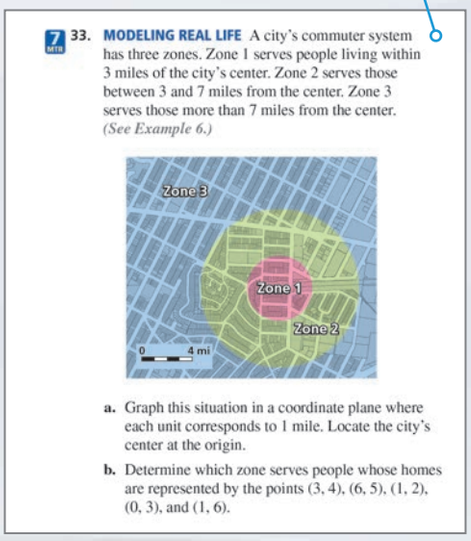
In every chapter, students have opportunities to explore, discover, and solidify conceptual understanding, then apply and transfer that learning. This program weaves together the three important building blocks of rigor.

- **Conceptual Understanding**
  Discovering why
- **Procedural Fluency**
  Learning how
- **Application**
  Knowing when to apply

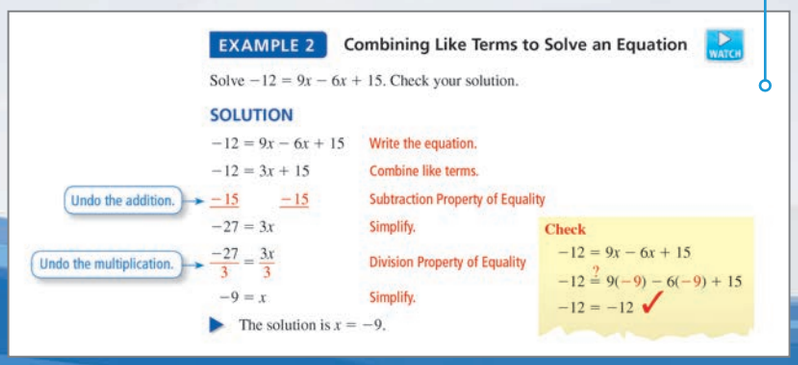


Students can develop foundational concepts with discovery in **Explore It!**

Students apply their knowledge with **Modeling Real Life**, **Dig Deeper**, and other non-routine problems to achieve deeper levels of learning. They solve problems in different contexts, see connections between ideas, and justify their thinking.



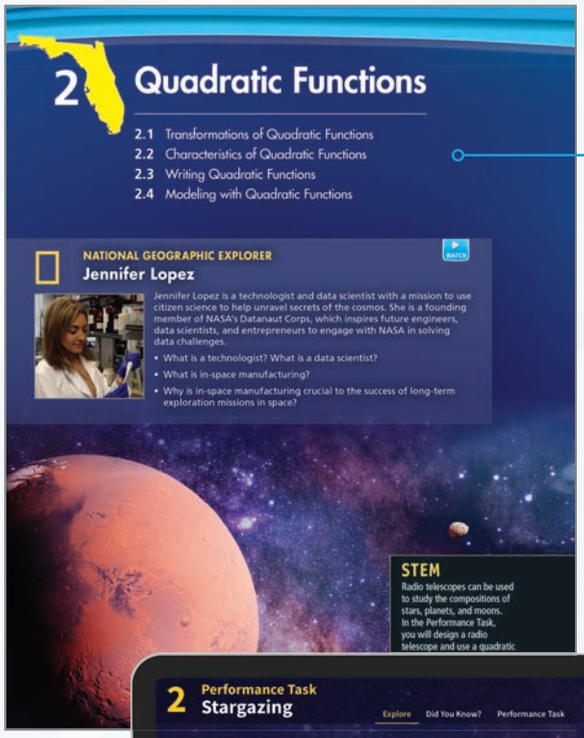
Students build procedural fluency with clear **Key Ideas** and **Examples**, then they have abundant opportunities to practice skills in **Self-Assessment**, **Practice**, and **Review & Refresh**.



A Program Geared Toward Fluency

What is Fluency?

Fluency is more than the memorization of facts or procedures. Fluency builds on a foundation of conceptual understanding, strategic reasoning, and problem-solving to achieve automaticity. Students connect their conceptual understanding with strategies and methods that makes sense to them.



Students begin every chapter discovering the research from a National Geographic Explorer and thinking about the world around them. Then they apply what they learn in the chapter to a related **Performance Task**.

Why Fluency Matters

By building fluency in arithmetic, students can efficiently use foundational skills to solve deeper, more meaningful problems about the world around them. Fluency will contribute to their success not only in school, but also in their daily life.

Modeling Real Life, **Dig Deeper**, and other non-routine problems help students apply and deepen their learning.

69. DIG DEEPER The function $t(r) = -35 \ln\left(1 - \frac{r}{100}\right)$ represents the time (in minutes) it takes to recharge a tablet battery from 0% to r% of its full charge.

a. Use technology to graph t for $0 < r < 100$ and for $0 < t < 350$.

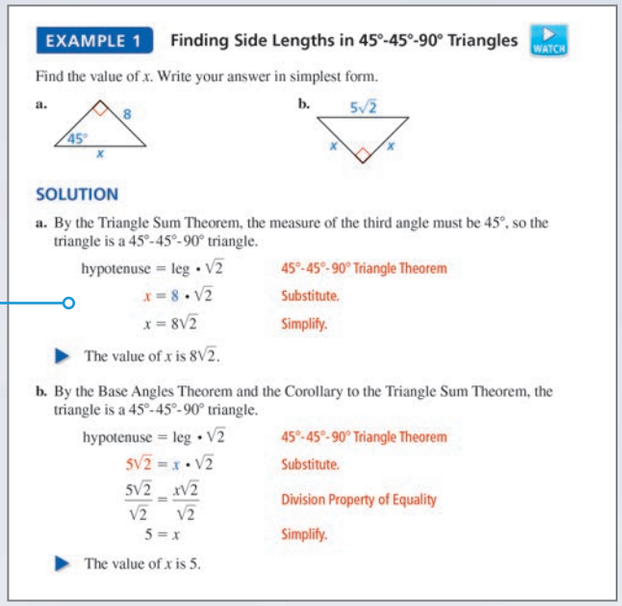
b. How long will it take to recharge the battery to 40% of its full charge?

c. Describe what happens to $t(r)$ as r increases in this situation.

Procedural Fluency

In previous grades, students solidified their understanding of arithmetic operations, found reliable methods for solving, and worked toward becoming independently fluent to solve problems. This program provides ample opportunities for students to practice and achieve fluency in any skills from prior grades, with support resources such as the *Skills Trainer*.

Students use procedures and standard algorithms to solve math problems and justify their thinking.



EXAMPLE 1 Finding Side Lengths in 45°-45°-90° Triangles

Find the value of x. Write your answer in simplest form.

a. $45°$, 8, x b. $5\sqrt{2}$, x, x

SOLUTION

a. By the Triangle Sum Theorem, the measure of the third angle must be 45°, so the triangle is a 45°-45°-90° triangle.

$\text{hypotenuse} = \text{leg} \cdot \sqrt{2}$ — 45°-45°-90° Triangle Theorem

$x = 8 \cdot \sqrt{2}$ — Substitute.

$x = 8\sqrt{2}$ — Simplify.

▶ The value of x is $8\sqrt{2}$.

b. By the Base Angles Theorem and the Corollary to the Triangle Sum Theorem, the triangle is a 45°-45°-90° triangle.

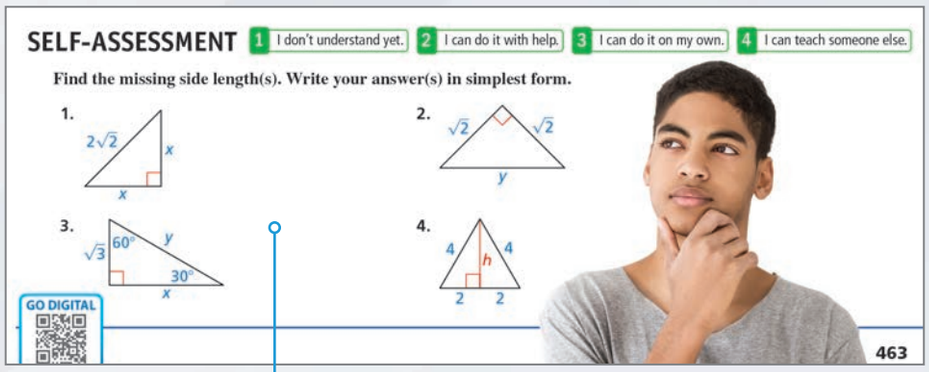
$\text{hypotenuse} = \text{leg} \cdot \sqrt{2}$ — 45°-45°-90° Triangle Theorem

$5\sqrt{2} = x \cdot \sqrt{2}$ — Substitute.

$\frac{5\sqrt{2}}{\sqrt{2}} = \frac{x\sqrt{2}}{\sqrt{2}}$ — Division Property of Equality

$5 = x$ — Simplify.

▶ The value of x is 5.



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.

Find the missing side length(s). Write your answer(s) in simplest form.

1. $2\sqrt{2}$, x, x 2. $\sqrt{2}$, $\sqrt{2}$, y

3. $\sqrt{3}$, $60°$, y, $30°$, x 4. 4, 4, h, 2, 2

GO DIGITAL

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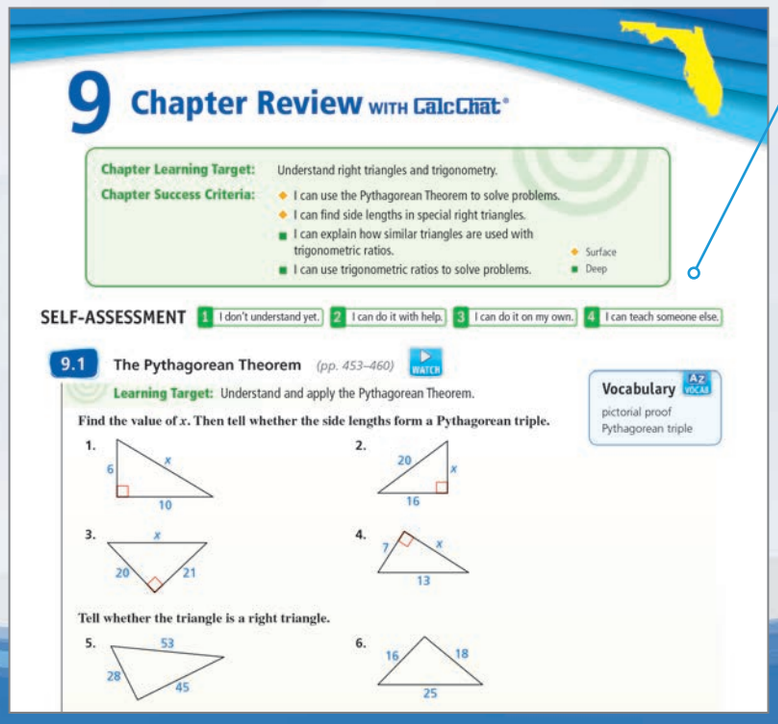
Students practice using standard algorithms to solve exercises in **Self-Assessment**, **Practice**, and **Review & Refresh**.

This cumulative practice feature gives students an opportunity to independently practice using accurate and efficient procedures.



9 Chapter Review WITH CalcChat®

Chapter Learning Target: Understand right triangles and trigonometry.

Chapter Success Criteria:
- I can use the Pythagorean Theorem to solve problems.
- I can find side lengths in special right triangles.
- I can explain how similar triangles are used with trigonometric ratios.
- I can use trigonometric ratios to solve problems.

Surface
Deep

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.

9.1 The Pythagorean Theorem (pp. 453–460)

Learning Target: Understand and apply the Pythagorean Theorem.

Vocabulary
pictorial proof
Pythagorean triple

Find the value of x. Then tell whether the side lengths form a Pythagorean triple.

1. 6, x, 10 2. 20, x, 16

3. x, 20, 21 4. 7, x, 13

Tell whether the triangle is a right triangle.

5. 53, 28, 45 6. 16, 18, 25

Embedded Mathematical Thinking

Encouraging Mathematical Mindsets

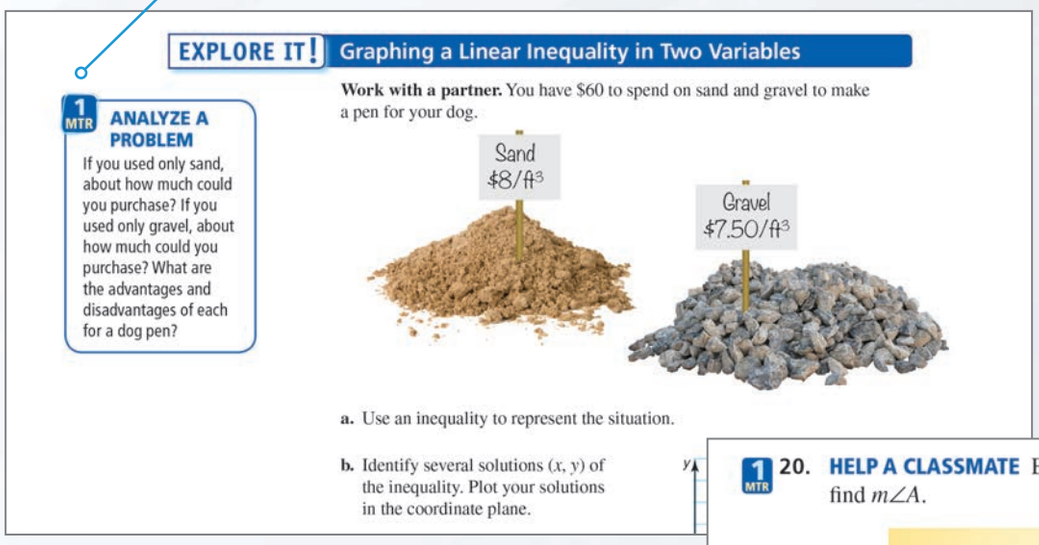
Developing proficiency in the **Mathematical Thinking and Reasoning (MTR) Standards** is about becoming a mathematical thinker. Students actively learn to ask why, and communicate with others as they learn. Use this guide to develop proficiency with each standard.

1

Students **Actively Participate in Effortful Learning** by staying engaged and maintaining a positive mindset when working to solve tasks. Students should ask questions and analyze the problem in a way that makes sense, persevering and modifying as needed, and support each other during challenging tasks or when attempting a new method or approach.

Look for labels such as:

- Analyze a Problem
- Ask a Question
- Persevere
- Stay Positive
- Help a Classmate



EXPLORE IT! Graphing a Linear Inequality in Two Variables

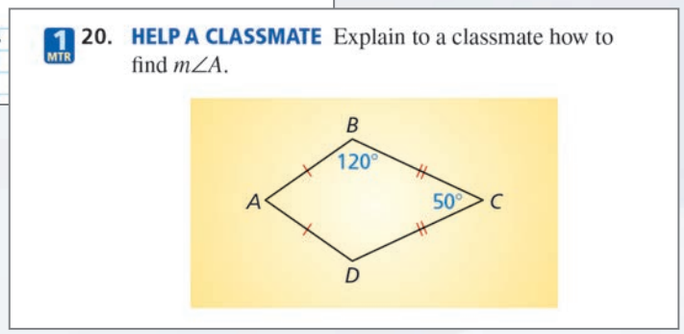
Work with a partner. You have $60 to spend on sand and gravel to make a pen for your dog.

1 MTR **ANALYZE A PROBLEM**

If you used only sand, about how much could you purchase? If you used only gravel, about how much could you purchase? What are the advantages and disadvantages of each for a dog pen?

a. Use an inequality to represent the situation.

b. Identify several solutions (x, y) of the inequality. Plot your solutions in the coordinate plane.



1 MTR **20. HELP A CLASSMATE** Explain to a classmate how to find $m\angle A$.

BUILDING TO FULL UNDERSTANDING

Throughout each course, students have opportunities to demonstrate specific aspects of the Mathematical Thinking and Reasoning Standards. Labels throughout the book indicate gateways to those aspects. Collectively, these opportunities lead to a full understanding of each standard. Developing these mindsets and habits gives meaning to the mathematics they learn.

and Reasoning Standards

2

Students **Demonstrate Understanding by Representing Problems in Multiple Ways** through modeling and by using objects, drawings, tables, and graphs to represent solutions. They progress from choosing representations to using algorithms and equations to connect concepts with models.

Look for labels such as:

- Model a Problem
- Use Another Method
- Multiple Representation
- Choose a Representation
- Make a Connection

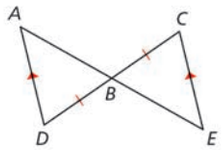
EXAMPLE 2 Using the ASA Congruence Theorem

WATCH

Write a proof.

Given $\overline{AD} \parallel \overline{EC}$, $\overline{BD} \cong \overline{BC}$

Prove $\triangle ABD \cong \triangle EBC$



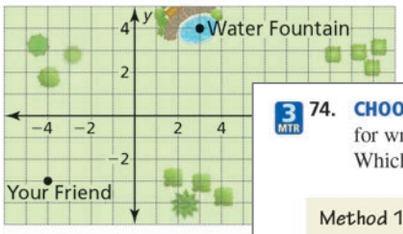
SOLUTION

STATEMENTS	REASONS
1. $\overline{AD} \parallel \overline{EC}$	1. Given
A 2. $\angle D \cong \angle C$	2. Alternate Interior Angles Theorem
S 3. $\overline{BD} \cong \overline{BC}$	3. Given
A 4. $\angle ABD \cong \angle EBC$	4. Vertical Angles Congruence Theorem
$\triangle EBC$	5. ASA Congruence Theorem

2 MTR USE ANOTHER METHOD

Use the AAS Congruence Theorem to prove that $\triangle ABD \cong \triangle EBC$.

3 MTR 51. **ADAPT A PROCEDURE** You and your friend plan to meet each other at the water fountain in a park. Write a system of equations that represents a possible route you take to the fountain and a possible route your friend takes to the fountain. Is the solution of your system the fountain? Justify your answer.



When students **Complete Tasks with Mathematical Fluency**, they select efficient methods to complete tasks accurately and with confidence. They stay flexible, using feedback to improve efficiency and adapting procedures to new concepts.

3

3 MTR 74. **CHOOSE A METHOD** Describe the methods shown for writing the complex expression in standard form. Which method do you prefer? Explain.

Method 1

$$4i(2 - 3i) + 4i(1 - 2i) = 8i - 12i^2 + 4i - 8i^2$$
$$= 8i - 12(-1) + 4i - 8(-1)$$
$$= 20 + 12i$$

Method 2

$$4i(2 - 3i) + 4i(1 - 2i) = 4i[(2 - 3i) + (1 - 2i)]$$
$$= 4i[3 - 5i]$$
$$= 12i - 20i^2$$
$$= 12i - 20(-1)$$
$$= 20 + 12i$$

Look for labels such as:

- Choose a Method
- Select Methods
- Maintain Accuracy
- Adapt a Procedure
- Reflect on Your Method

Embedded Mathematical Thinking

4

When students **Engage in Discussions that Reflect on the Mathematical Thinking of Self and Others**, they analyze and compare their own mathematical ideas and thinking together with their peers. By recognizing errors and justifying results, they can construct possible arguments based on evidence.

Look for labels such as:

- Communicate Clearly
- Discuss Mathematical Thinking
- Error Analysis
- Compare Methods
- Construct an Argument
- Making an Argument
- Justify a Result
- Which One Doesn't Belong?
- Different Words, Same Question

EXPLORE IT! Displaying Data

Work with a partner. Analyze the data and then create a display that best represents the data. Explain your choice of data display.

a. The Montana Department of Fish, Wildlife & Parks reported the following numbers of claims made to retrieve elk killed on roadways.

adult male: 69 adult female: 178 calf: 52

b. The data below show the numbers of deer killed on roads in one region of Colorado from 2007 to 2018.

OBSERVED DEER FATALITIES

2007: 352	2011: 315	2015: 159
2008: 348	2012: 275	2016: 301
2009: 264	2013: 139	2017: 291
2010: 336	2014: 116	2018: 220

c. A yearlong study by volunteers in California reported the following numbers of animals killed by motor vehicles.

4 MTR COMPARE METHODS

Compare your data displays in parts (a)–(c) with other students. Can more than one display be appropriate for a set of data?

5

Students **Use Patterns and Structure to Help Understand and Connect Concepts** by focusing on details, finding logical order, or breaking down a problem into smaller parts. They often look for similarities between a new concept and something they learned before.

Look for labels such as:

- Make a Plan
- Relate Concepts
- Connecting Concepts
- Use a Similar Problem
- Decompose a Problem
- Patterns
- Structure

EXAMPLE 5 Finding the Surface Area of a Similar Solid WATCH

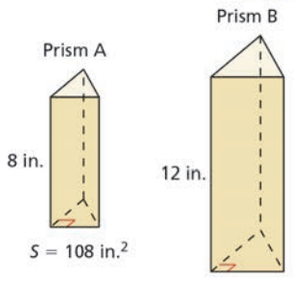
Prism A and prism B are similar. Find the surface area of prism B.

SOLUTION

The scale factor is $k = \frac{\text{Height of prism B}}{\text{Height of prism A}}$

$= \frac{12}{8}$

$= \frac{3}{2}$



Use the scale factor to find the surface area of prism B.

$\frac{\text{Surface area of prism B}}{\text{Surface area of prism A}} = k^2$ The ratio of the surface areas is k^2.

5 MTR RELATE CONCEPTS

Explain how your previous understanding of dilations and scale factors in two dimensions is related to finding surface areas of similar solids.

and Reasoning Standards (continued)

When students **Assess the Reasonableness of Solutions**, they develop a habit of checking their calculations when solving problems. They estimate to determine possible solutions and use benchmarks to determine if a solution makes sense.

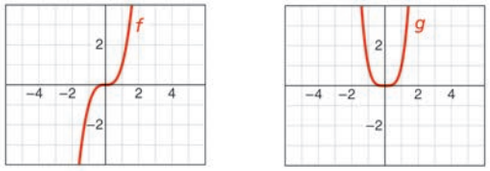
6

Look for labels such as:

- Assess Reasonableness
- Justifying Steps

EXPLORE IT! Transforming Graphs of Cubic and Quartic Functions

Work with a partner. The graphs of the parent cubic function $f(x) = x^3$ and the parent quartic function $g(x) = x^4$ are shown.



6 MTR **ASSESS REASONABLENESS**
Explain why it is reasonable that the range of f includes negative numbers, but the range of g does not.

6 MTR **87. JUSTIFYING STEPS** Justify each step in the simplification of i^2.

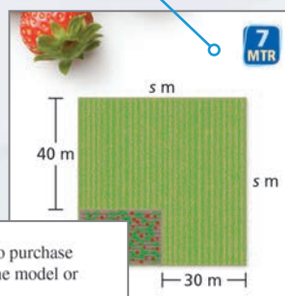
Algebraic Step	Justification
$i^2 = (\sqrt{-1})^2$	
$= -1$	

7

When students **Apply Mathematics to Real-World Contexts**, they connect concepts to everyday experiences and use models and methods to understand, represent, and solve problems.

Look for labels such as:

- Apply Mathematics
- Modeling Real Life
- Investigate
- Performance Task



7 MTR **EXAMPLE 4** Modeling Real Life WATCH

A farmer plants a rectangular strawberry patch in a corner of a square plot of land. The area of the strawberry patch is 600 square meters. What is the area of the square plot of land?

SOLUTION

1. **Understand the Problem** You are given the area of a strawberry patch and a diagram showing dimensions of a plot of land that contains the strawberry patch. You are asked to find the total area of the plot of land.
2. **Make a Plan** The length of the strawberry patch is $(s - 30)$ meters, and the width is $(s - 40)$ meters. Write and solve an equation to find the side length s. Then use the solution to find the area of the square plot of land.
3. **Solve and Check** Use the formula for the area of a rectangle to write an equation. Then solve to find the side length s of the square plot of land.

$600 = (s - 30)(s - 40)$ Write an equation.

$600 = s^2 - 70s + 1200$ Multiply.

7 MTR **25. PERFORMANCE TASK** Your family wants to purchase a new vehicle that comes in either a gasoline model or an electric model.

a. Using the information shown, the approximate number of miles your family drives per year, and gas and electricity prices in your area, determine which vehicle is a better buy. Use linear equations to support your answer.

b. Research other factors that affect the cost of vehicle ownership. How might these factors support or change your answer?

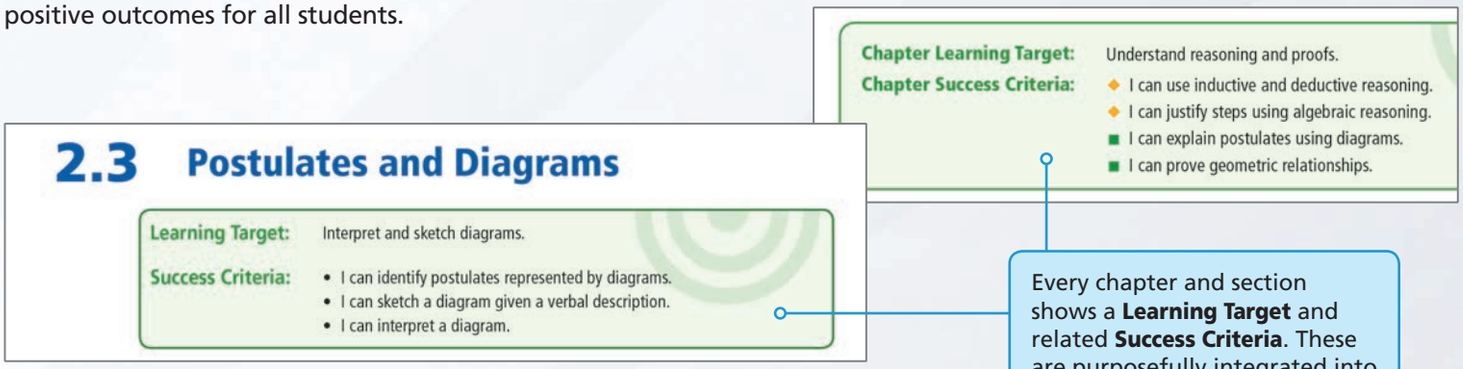
Gasoline
Price: $17,950
Fuel Economy:
26 mi/gal city
38 mi/gal highway

Electric
Price: $29,120
Fuel Economy:
31 kWh/100 mi

Visible Learning Through Learning Targets,

Making Learning Visible

Knowing the learning intention of a chapter or section helps students focus on the purpose of an activity, rather than simply completing it in isolation. This program supports visible learning through the consistent use of Learning Targets and Success Criteria to ensure positive outcomes for all students.



Chapter Learning Target: Understand reasoning and proofs.

Chapter Success Criteria:
- I can use inductive and deductive reasoning.
- I can justify steps using algebraic reasoning.
- I can explain postulates using diagrams.
- I can prove geometric relationships.

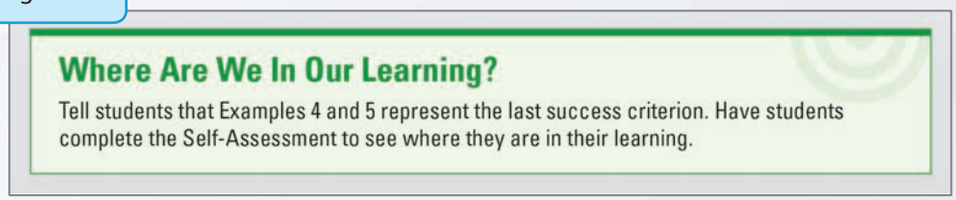
2.3 Postulates and Diagrams

Learning Target: Interpret and sketch diagrams.

Success Criteria:
- I can identify postulates represented by diagrams.
- I can sketch a diagram given a verbal description.
- I can interpret a diagram.

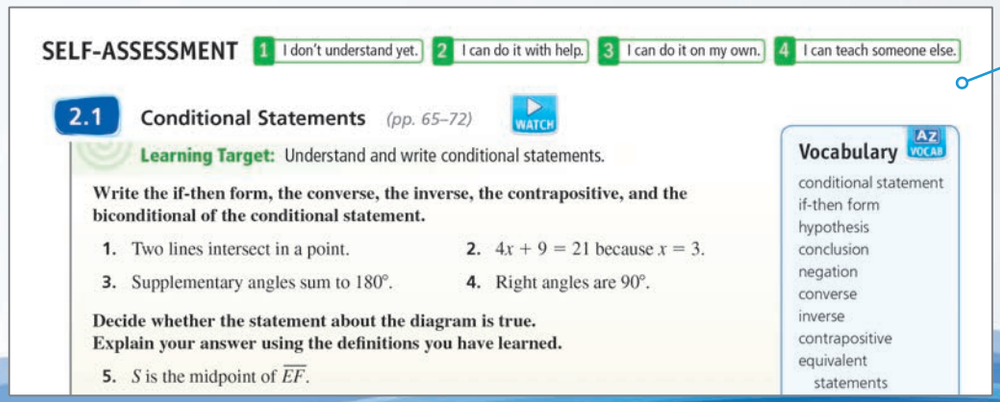
Every chapter and section shows a **Learning Target** and related **Success Criteria**. These are purposefully integrated into each carefully written section.

Where Are We In Our Learning? suggests when and how to check for student understanding.



Where Are We In Our Learning?

Tell students that Examples 4 and 5 represent the last success criterion. Have students complete the Self-Assessment to see where they are in their learning.



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.

2.1 Conditional Statements *(pp. 65–72)* WATCH

Learning Target: Understand and write conditional statements.

Write the if-then form, the converse, the inverse, the contrapositive, and the biconditional of the conditional statement.

1. Two lines intersect in a point.
2. $4x + 9 = 21$ because $x = 3$.
3. Supplementary angles sum to 180°.
4. Right angles are 90°.

Decide whether the statement about the diagram is true. Explain your answer using the definitions you have learned.

5. S is the midpoint of $\overline{EF}$.

Vocabulary AZ VOCAB
conditional statement
if-then form
hypothesis
conclusion
negation
converse
inverse
contrapositive
equivalent statements

The **Self-Assessment** and **Chapter Review** remind students to rate their understanding of the Learning Targets. In the Chapter Review, students can review each section with a reminder of that section's Learning Target.

QUESTIONS FOR LEARNERS

As students progress through a section, they should be able to answer the following questions.

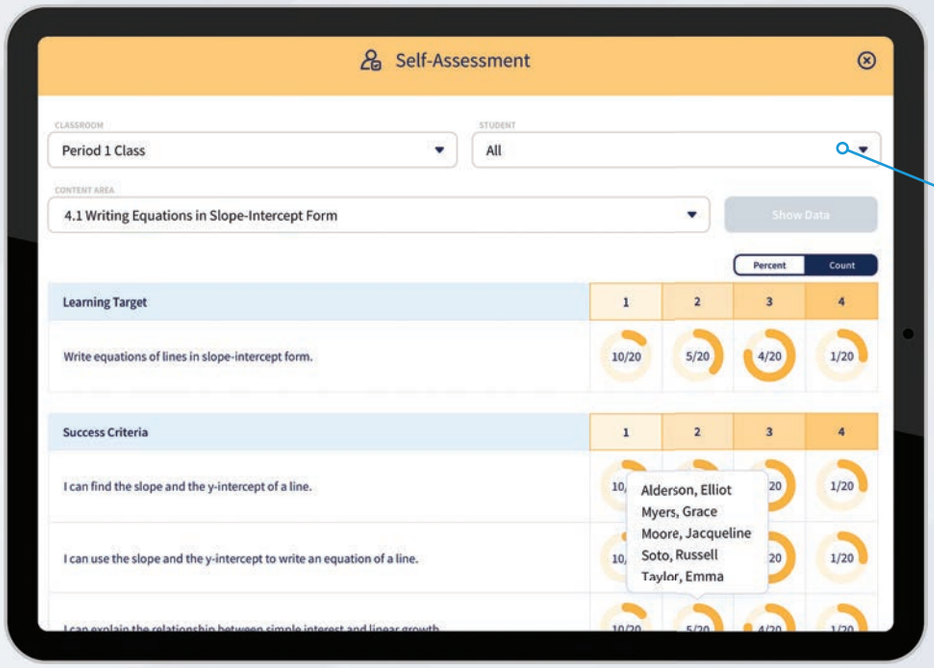
- What are you learning?
- Why are you learning this?
- Where are you in your learning?
- How will you know when you have learned it?
- Where are you going next?

Success Criteria, and Self-Assessment

Chapter 4 Writing Linear Functions		
Learning Target: Understand writing linear functions.	1 2 3 4	
I can determine the slope of a line given ordered pairs, a graph, a table, or a context.	1 2 3 4	
I can write the equation of a line in different forms.	1 2 3 4	
I can write equations to model and solve real-life problems.	1 2 3 4	
I can interpret scatter plots and analyze lines of fit.	1 2 3 4	

Students use a 4-point scale to rate their understanding of each success criterion. They can keep track of their learning on paper or online.

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.



When students use the online **Self-Assessment** tool to keep track of their learning, you can view easy-to-read live reports to inform your instruction.

Ensuring Positive Outcomes

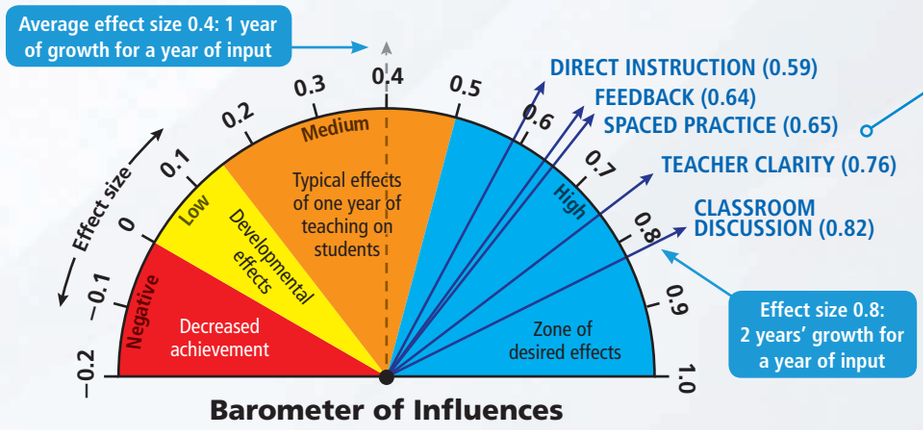
John Hattie's *Visible Learning* research consistently shows that using Learning Targets and Success Criteria can result in two years' growth in one year, ensuring positive outcomes for student learning and achievement.

Sophie Murphy, M.Ed., wrote the chapter-level Learning Targets and Success Criteria for this program. Sophie is currently completing her Ph.D. at the University of Melbourne in Australia with Professor John Hattie as her leading supervisor. Sophie completed her Master's thesis with Professor John Hattie in 2015. Sophie has over 20 years of experience as a teacher and school leader in private and public school settings in Australia.

High-Impact Strategies for Student Achievement

Five Strategies for Purposeful Focus

Many of the things we do as educators have a positive effect on student learning, but which ones have the greatest impact? Professor John Hattie, in his *Visible Learning* network, identified more than 250 influences on student learning, and developed a way of ranking them. He conducted meta-analyses and compared the influences by their **effect size**—the impact the factor had on student learning.



Barometer of Influences

We focus on **STRATEGIES** with some of the **HIGHEST IMPACT** on student achievement—up to 2 years of learning for a year of input.

Where Are We In Our Learning?

Connect the examples to the first two success criteria. Be explicit and say, "In Example 2(a), when you multiply each side of the equation by −5, you produce an equivalent equation. The equations $-\frac{n}{5} = -3$ and $n = 15$ have the same solution."

FEEDBACK

Actively listen as you probe for student understanding, being mindful of the feedback that you provide. This helps you make instructional decisions for where to go next.

In solving multi-step equations, the goal is to isolate the variable. Have students *Turn and Talk* to their neighbors. Ask Partner A to explain what "isolating the variable" means and how it is done. Select a Partner B to summarize for the class what he or she heard.

CLASSROOM DISCUSSION

Encourage your students to talk! This solidifies understanding and helps them to reason. Students benefit from hearing the reasoning of classmates and hearing peers critique their own reasoning.

TEACHER CLARITY

Make the Learning Target clear before starting a section, and as students explore and learn, continue to connect their experiences back to the Success Criteria.

Laurie's Notes

- Write the definition of a *literal equation*. Solicit examples of familiar formulas and explain that each formula is a type of literal equation. This will help students identify literal equations.

DIRECT INSTRUCTION

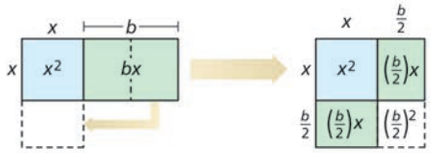
Follow exploration and discovery with explicit instruction to build procedural skill and fluency. Teach with clear examples carefully designed to ensure your students meet the Success Criteria.

KEY IDEA

Completing the Square

Words To complete the square for the expression $x^2 + bx$, add $\left(\frac{b}{2}\right)^2$.

Diagrams In each diagram, the combined area of the shaded regions is $x^2 + bx$. Adding $\left(\frac{b}{2}\right)^2$ completes the square in the second diagram.



Algebra $x^2 + bx + \left(\frac{b}{2}\right)^2 = \left(x + \frac{b}{2}\right)\left(x + \frac{b}{2}\right) = \left(x + \frac{b}{2}\right)^2$

REVIEW & REFRESH

In Exercises 72–74, graph the function. Label the vertex, axis of symmetry, and *x*-intercepts.

72. $g(x) = 6(x - 4)^2$

73. $f(x) = x^2 + 2x + 5$

74. $f(x) = 2(x + 10)(x - 12)$

In Exercises 75–78, solve the inequality. Graph the solution.

75. $2x - 3 < 5$

76. $4 - 8y \geq 12$

5 MTR **85.** **STRUCTURE** For what value of m are the graphs of $-2y = 3x - 8$ and $y = mx - 6$ parallel? perpendicular?

In Exercises 86 and 87, write a function *g* whose graph represents the indicated transformation of the graph of *f*.

86. $f(x) = 3|x + 5|$; reflection in the *x*-axis

87. $f(x) = \frac{1}{3}x - \frac{2}{3}$; translation 4 units left

SPACED PRACTICE

Effective practice does not just focus on a single topic of new learning; students must revisit concepts over time so deeper learning occurs. This program cohesively offers multiple opportunities to build conceptual understanding by revisiting and applying concepts throughout subsequent lessons and chapters. **Review & Refresh** exercises in every section also provide continual practice on the major topics.

Daily Support from a Master Educator

In Laurie's Notes, master educator Laurie Boswell uses her professional training and years of experience to help you guide your students to better understanding.

Laurie studied Professor John Hattie's research on *Visible Learning* and met with Hattie on multiple occasions to ensure she was interpreting his research accurately and embedding it effectively. Laurie's expertise continues with an ongoing collaboration with Sophie Murphy, who is pursuing her Ph.D. under Professor Hattie.

How to Use This Program: Plan

Taking Advantage of Your Resources

You play an indispensable role in your students' learning. This program provides rich resources for learners of all levels to help you **Plan**, **Teach**, and **Assess**.

Plan every chapter and section with tools in the Teaching Edition such as **Suggested Pacing**, **Progression Tables**, and chapter and section **Overviews** written by Laurie Boswell.

Laurie's Overview

Students just finished a chapter on solving linear equations. The techniques used in solving linear equations are applied to linear inequalities in this chapter. The chapter begins with an introduction to writing and graphing inequalities. Color-coding is used to help students develop confidence in writing inequalities. Graphs are used to display and check solutions. The next three sections focus on solving increasingly complex inequalities. Tools used in developing facility with these problems include symbolic manipulation, tables, and spreadsheets. Practice with real number operations is integrated throughout. The last two sections of the chapter introduce compound inequalities. Look for the helpful teaching strategies offered in these sections. Note that new *Formative Assessment Tips* are offered in many of the sections, and tips from the previous chapter are referenced throughout the notes at point of use.

Florida Benchmarks	*COHERENCE* Through the Chapter					
	6.1	6.2	6.3	6.4	6.5	6.6
MA.912.GR.1.1 Prove relationships and theorems about lines and angles. Solve mathematical and real-world problems involving postulates, relationships and theorems of lines and angles.	★					
MA.912.GR.1.3 Prove relationships and theorems about triangles. Solve mathematical and real-world problems involving postulates, relationships and theorems of triangles.		●	●	●	●	●
MA.912.GR.3.3 Use coordinate geometry to solve mathematical and real-world geometric problems involving lines, circles, triangles and quadrilaterals.			●			
MA.912.GR.5.3 Construct the inscribed and circumscribed circles of a triangle.		★				
(H) **MA.912.LT.4.8** Construct proofs, including proofs by contradiction.					●	★

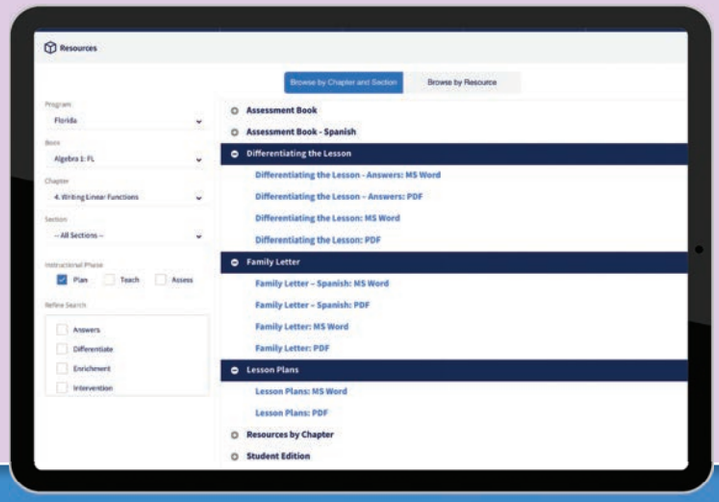
Key: ▲ = preparing ● = learning ★ = complete

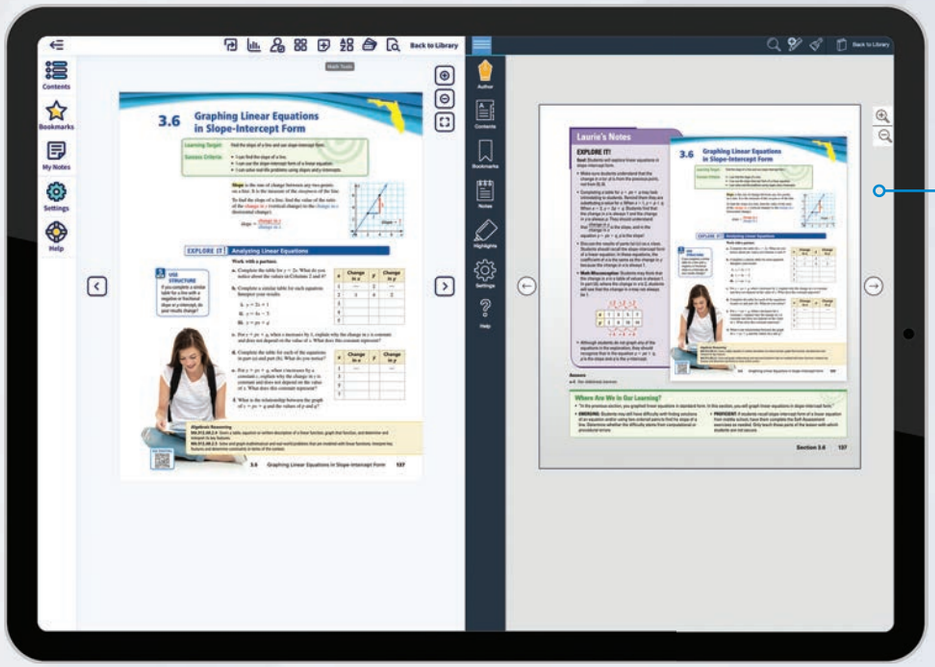
Watch **Everyday Connections Videos** to develop insights about how the math content progresses pedagogically across grades or how to incorporate technology tools into your teaching.

Everyday Connections
Learn more about applications of exponential Functions.

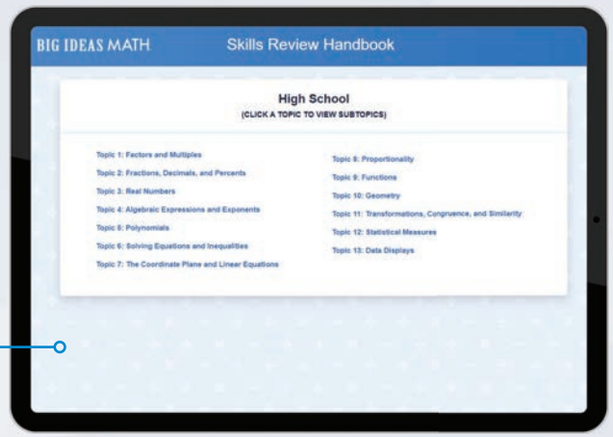
Find Your Resources Digitally

Use the resources page that is available on your *BigIdeasMath.com* dashboard. Here, you can download, customize, and print these planning resources and many more. Use the filters to view resources specific to a chapter or section.





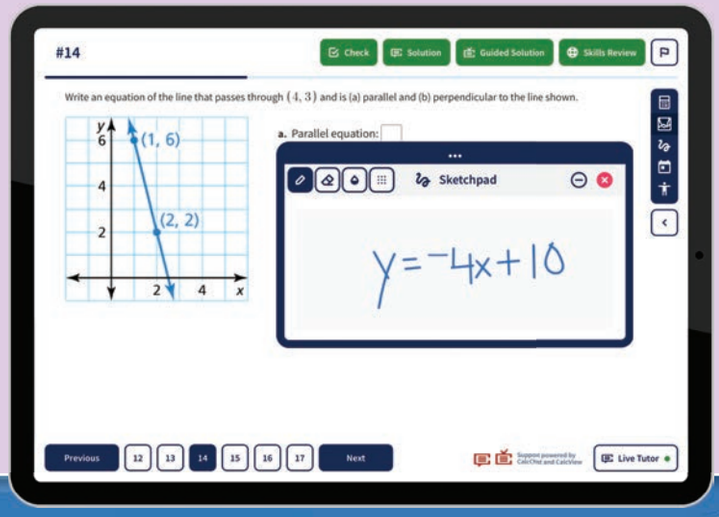
Access all planning resources of the Teaching Edition in the **Dynamic Classroom**. Use the customizable **Lesson Plans** to help teach each lesson to meet your specific classroom needs.



Review topics using the **Skills Review Handbook** to support students. Each topic includes a key concept, vocabulary, examples, and exercises.

Plan Online

As you are planning, remember that the **Dynamic Classroom** has the same interactive tools, such as the digital **Sketchpad**, that students use to model concepts. Plan ahead by practicing with these tools to guide students as they use these manipulatives and models.

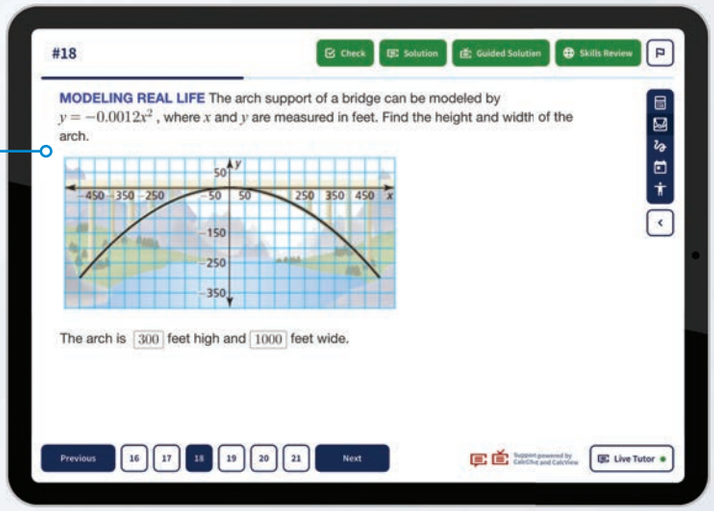


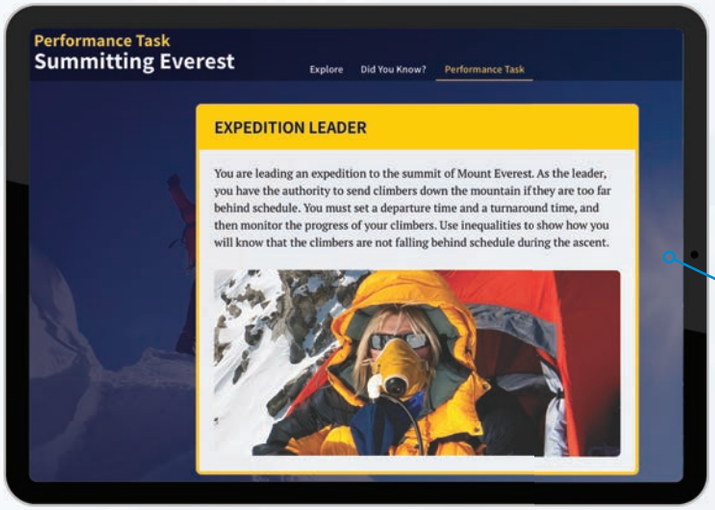
How to Use This Program: Teach

Multiple Pathways for Instruction

Everything you need to make the best instructional choices for your students is at your fingertips.

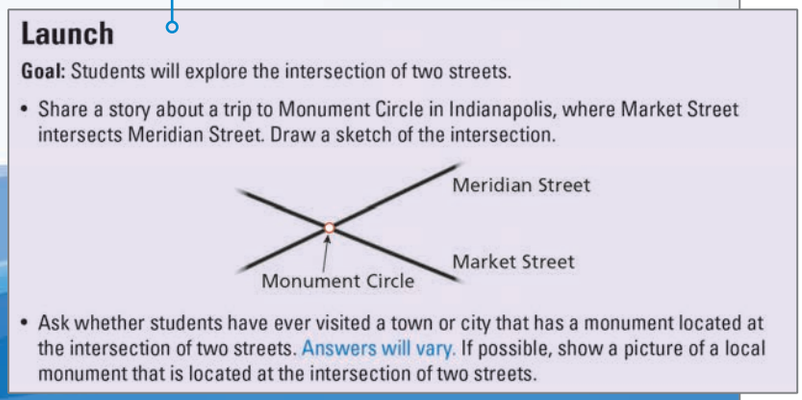
Present all content digitally using the **Dynamic Classroom**. Send students a page link on the fly with **Flip-To** to direct where you want your students to go.

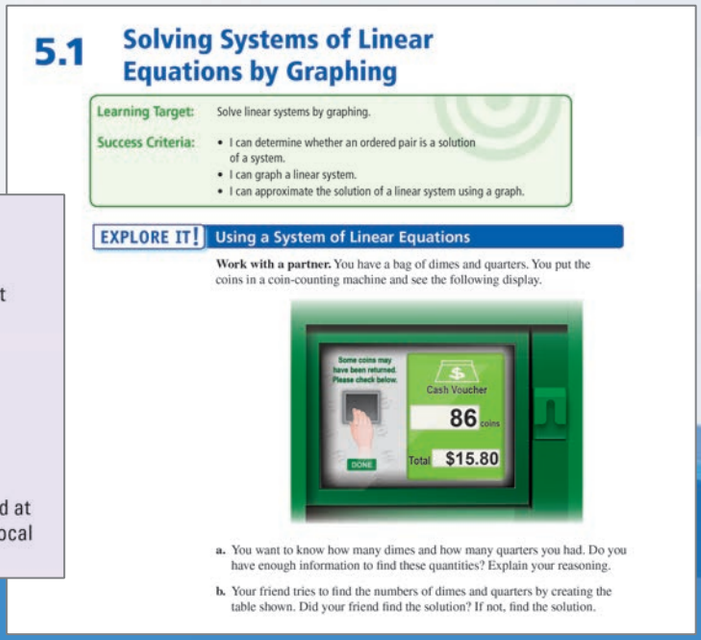




Have students think ahead about chapter concepts in the world around them with a **National Geographic Explorer's** STEM research. Students can then apply their learning in the **Performance Task** at the end of the chapter.

Engage students with a creative hook at the beginning of each section with **Launch**. This activity, written by master educator Laurie Boswell, provides a conceptual introduction to the section. Then, encourage mathematical discovery with **Explore It!**





Lead students to procedural fluency with clear **Examples** and **Self-Assessment** opportunities for them to try on their own.

Solve $3x + 2 = 23 - 4x$. Justify each step.

SOLUTION

Equation	Explanation	Reason
$3x + 2 = 23 - 4x$	Write the equation.	Given
$3x + 2 + 4x = 23 - 4x + 4x$	Add $4x$ to each side.	Addition Property of Equality
$7x + 2 = 23$	Combine like terms.	Simplify.
$7x + 2 - 2 = 23 - 2$	Subtract 2 from each side.	Subtraction Property of Equality
$7x = 21$	Combine constant terms.	Simplify.
$x = 3$	Divide each side by 7.	Division Property of Equality

7 MTR **EXAMPLE 5** **Modeling Real Life** WATCH

A park, a shoe store, a pizza shop, and a movie theater are located, in that order, on a city street. The distance between the park and the shoe store is the same as the distance between the pizza shop and the movie theater. Show that the distance between the park and the pizza shop is the same as the distance between the shoe store and the movie theater.

SOLUTION

1. **Understand the Problem** You know that the locations lie in order and that the distance between two of the locations (park and shoe store) is the same as the distance between the other two locations (pizza shop and movie theater). You need to show that two of the other distances are the same.
2. **Make a Plan** Draw and label a diagram to represent the situation.

park — shoe store — pizza shop — movie theater

Modify your diagram by letting the points P, S, Z, and M represent the park, the shoe store, the pizza shop, and the movie theater, respectively. Show any mathematical relationships.

P — S — Z — M

Use the Segment Addition Postulate to show that $PZ = SM$.

Help students apply and problem solve with **Modeling Real Life** applications, **Dig Deeper** problems, and **Mathematical Thinking and Reasoning** conceptual problems.

Where Are We In Our Learning?

- "In the lesson, you will work with exponential functions that represent growth and decay. What do you think the graphs will look like? What do you think the equations will look like?"
- **EMERGING:** Students may still need help evaluating and interpreting exponential functions. A reference sheet or an anchor chart should be visible so students can refer to it as needed. Remind students of the constraints on the base of an exponential function, $b > 1$ (growth) or $0 < b < 1$ (decay).
- **PROFICIENT:** Students can identify increasing and decreasing exponential functions. Be sure they can distinguish between the growth factor and the rate of growth as well as the decay factor and the rate of decay.

Let **Laurie's Notes** guide your teaching and scaffolding decisions at every step to support and deepen all students' learning. You may want to group students differently as they move in and out of these levels with each skill and concept. Student self-assessments and feedback help guide your instructional decisions about how and when to layer support.

Differentiate and support your learners with **Differentiating the Lesson**, **Resources by Chapter**, **English Language Support**, and much more.

Name _____

1.2 Extra Practice

In Exercises 1–6, solve the equation. Check your solution.

1. $8 = \frac{t}{-3} + 4$
2. $\frac{p + 5}{-2} = 9$
3. $3k + 2k = 60$
4. $-43 = 12 - 6p + p$
5. $28 = 8b + 13b - 35$
6. $-11j - 6 + 3j = -30$
7. A bill to landscape your yard is \$720. The materials cost \$375 and the labor is \$34.50 per hour. Write and solve an equation to find the number of hours of labor spent landscaping your yard.

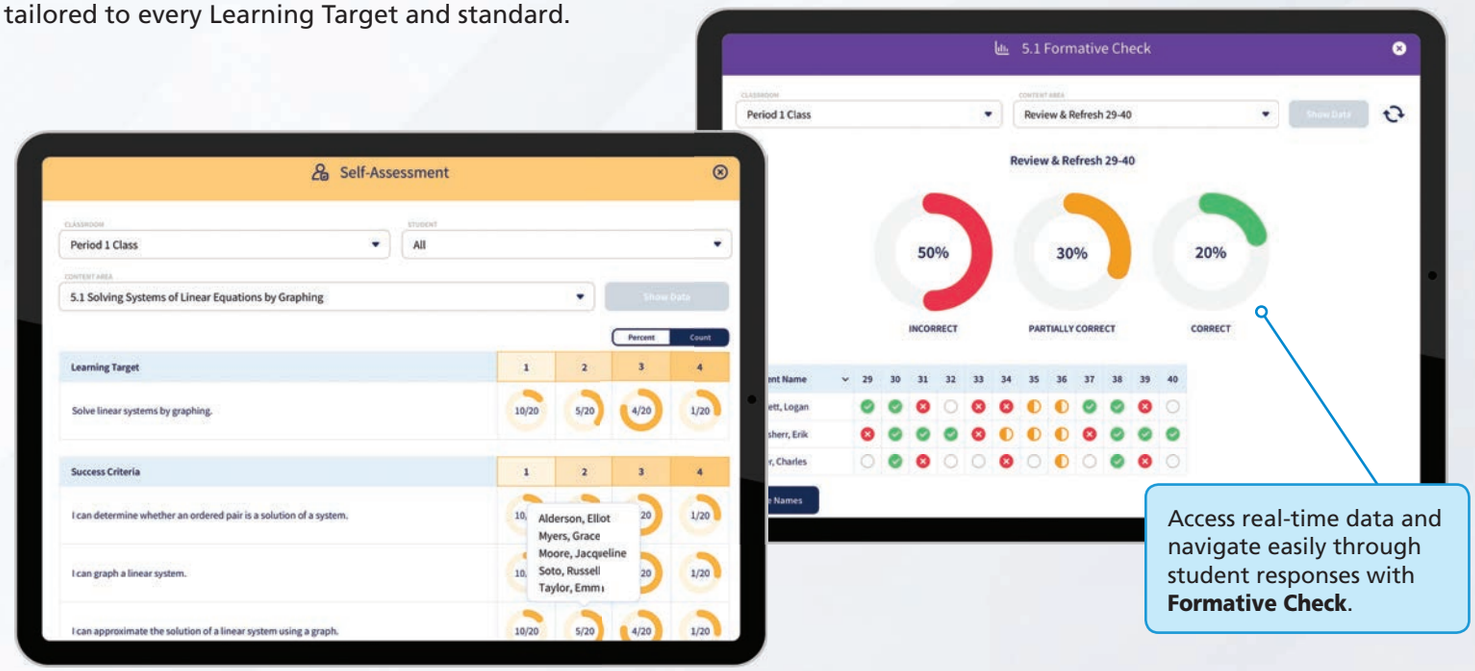
In Exercises 8–11, solve the equation. Check your solution.

8. $12 - 5(3r + 2) = 17$
9. $3(x - 2) + 5(2 - x) = 16$
10. $3 = -1(v - 4) + 4(2v - 9)$
11. $6(q - 7) - 3(4 - q) = 0$

How to Use This Program: Assess

Powerful Assessment Tools

Gain insight into your students' learning with these powerful formative and summative assessment tools tailored to every Learning Target and standard.



Access real-time data and navigate easily through student responses with **Formative Check**.

Name_____ Date____

Chapter 1 Quiz
For use after Section 1.4

Solve the equation.

1. $p - 3 = -3$
2. $-8c = -72$
3. $-2m - 7 = 3$
4. $-4(x - 3) - 8 = -4$
5. An object weighs exactly 5 pounds. You measure the object to weigh 5.018 pounds and your friend measures the object to weigh 4.97 pounds. Who has the most accurate measurement?

Assign **Quizzes** or **Chapter Tests** to assess understanding of section or chapter content, or use **Alternative Assessments** and **Performance Tasks**, which include scoring rubrics.

Scaffold assignments to support all students in their learning progression. The suggested assignments are a starting point. Assign additional exercises as appropriate to move every student toward proficiency.

Assignment Guide

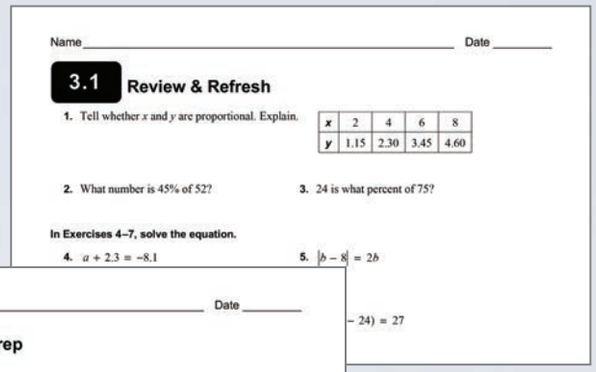
- Use the results from the □ exercises to provide differentiated support for all learners.
- Assign Review & Refresh exercises as appropriate for continued spaced practice.

H Review & Refresh Exercise 56 contains honors content.

Exercise	Emerging	Proficient	Advanced	DOK 1	DOK 2	DOK 3
1	●			●		
2	●	●	●	●		
3	□			●		
4	●	□	□	●		
5	●			●		
6		●	●	●		
7	□			●		
8		□	●	●		
9	●			●		
10		●	□	●		
11	●			●		
12		□	□	●		

Assign print or digital versions of **Practice** using the **Assignment Guide** to scaffold for your students. Project answers and solutions in class using the **Answer Presentation Tool**.

Use the **B.E.S.T. Test Prep and Practice Workbook** to check understanding of prior skills, chapter and section Learning Targets and Success Criteria, and to prepare students for chapter and cumulative standardized test questions.



Name _____ Date _____

3.1 Review & Refresh

1. Tell whether x and y are proportional. Explain.

x	2	4	6	8
y	1.15	2.30	3.45	4.60

2. What number is 45% of 52?

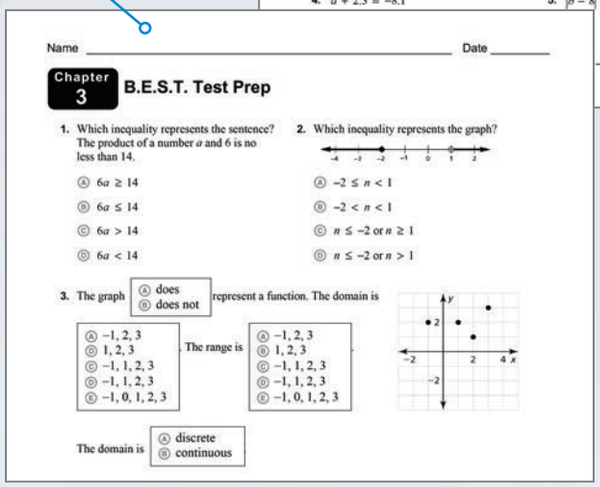
3. 24 is what percent of 75?

In Exercises 4–7, solve the equation.

4. $a + 2.3 = -8.1$

5. $|b - 8| = 2b$

$- 24) = 27$



Name _____ Date _____

Chapter 3 B.E.S.T. Test Prep

1. Which inequality represents the sentence? The product of a number a and 6 is no less than 14.

Ⓐ $6a \geq 14$
Ⓑ $6a \leq 14$
Ⓒ $6a > 14$
Ⓓ $6a < 14$

2. Which inequality represents the graph?

Ⓐ $-2 \leq n < 1$
Ⓑ $-2 < n < 1$
Ⓒ $n \leq -2$ or $n \geq 1$
Ⓓ $n \leq -2$ or $n > 1$

3. The graph [Ⓐ does / Ⓑ does not] represent a function. The domain is

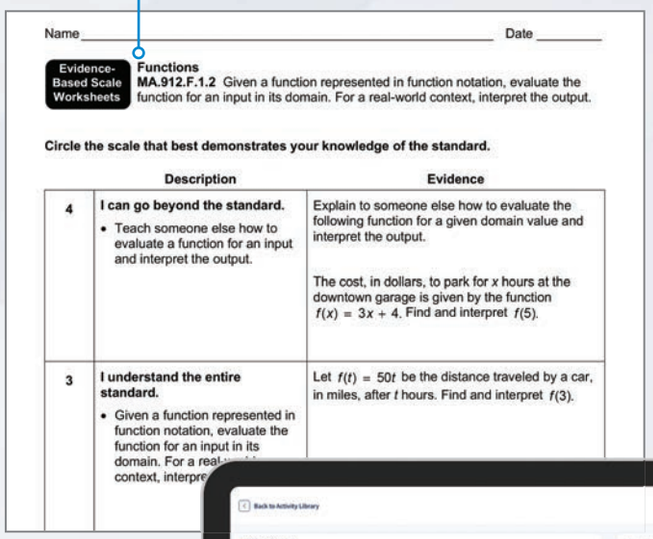
Ⓐ $-1, 2, 3$
Ⓑ $1, 2, 3$
Ⓒ $-1, 1, 2, 3$
Ⓓ $-1, 1, 2, 3$
Ⓔ $-1, 0, 1, 2, 3$

The range is

Ⓐ $-1, 2, 3$
Ⓑ $1, 2, 3$
Ⓒ $-1, 1, 2, 3$
Ⓓ $-1, 1, 2, 3$
Ⓔ $-1, 0, 1, 2, 3$

The domain is [Ⓐ discrete / Ⓑ continuous]

Use the **Evidence-Based Scale Worksheets** to assess student knowledge and understanding of each Florida Benchmark on a 1–4 rating scale. Use the results to help plan instruction and intervention.



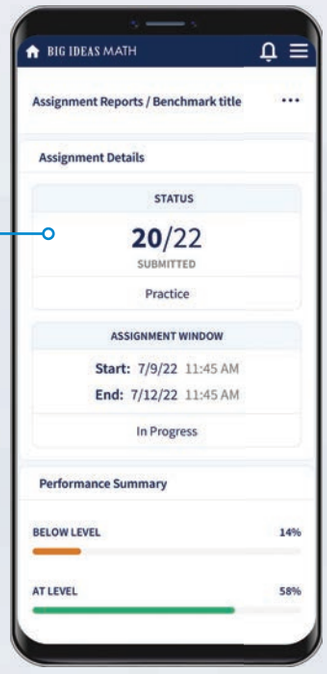
Name _____ Date _____

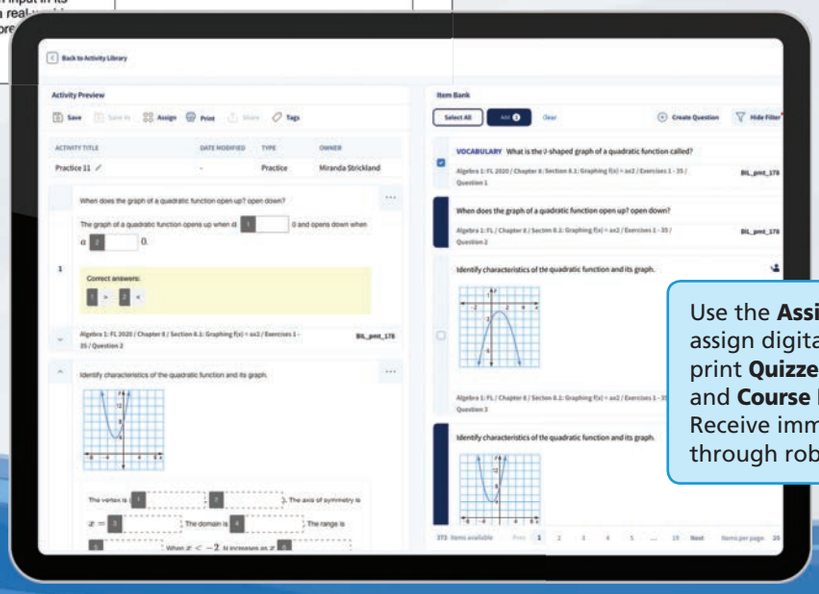
Evidence-Based Scale Worksheets **Functions**
MA.912.F.1.2 Given a function represented in function notation, evaluate the function for an input in its domain. For a real-world context, interpret the output.

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

	Description	Evidence
4	**I can go beyond the standard.** • Teach someone else how to evaluate a function for an input and interpret the output.	Explain to someone else how to evaluate the following function for a given domain value and interpret the output. The cost, in dollars, to park for x hours at the downtown garage is given by the function $f(x) = 3x + 4$. Find and interpret $f(5)$.
3	**I understand the entire standard.** • Given a function represented in function notation, evaluate the function for an input in its domain. For a real-[illegible] context, interpre	Let $f(t) = 50t$ be the distance traveled by a car, in miles, after t hours. Find and interpret $f(3)$.

Measure learning across grades with adaptive **Progression Benchmark Tests**.



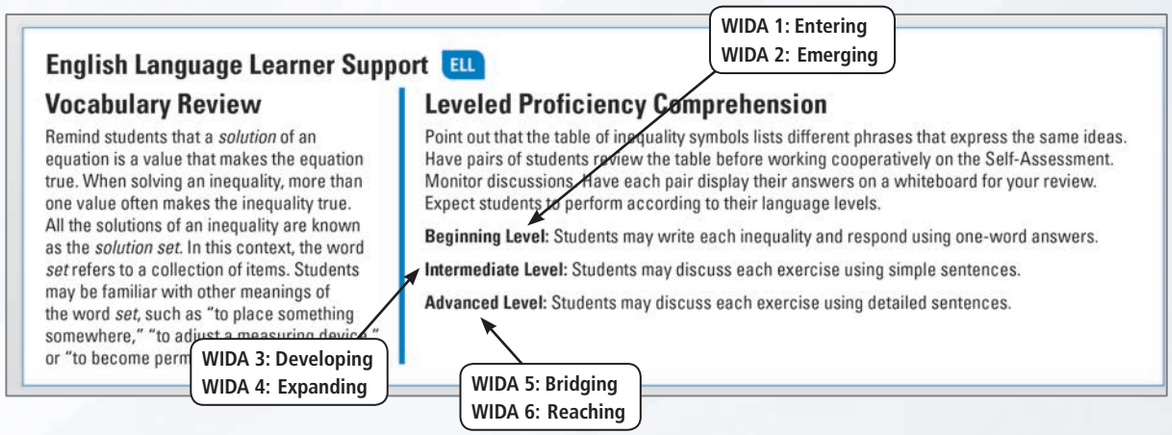


Use the **Assignment Builder** to assign digital versions of the print **Quizzes**, **Chapter Tests**, and **Course Benchmark Tests**. Receive immediate feedback through robust reporting.

Strategic Support for All Learners

Support for English Language Learners

Support your English Language Learner (ELL) students with a blend of print and digital resources available in Spanish. Look to your Teaching Edition for opportunities to support all students with the language development needed for mathematical understanding.



Students' WIDA scores are a starting point. As the year progresses and students' language skills change and grow, students may move in and out of language levels with varying content language demands.

Clarify, Connect, and Scaffold

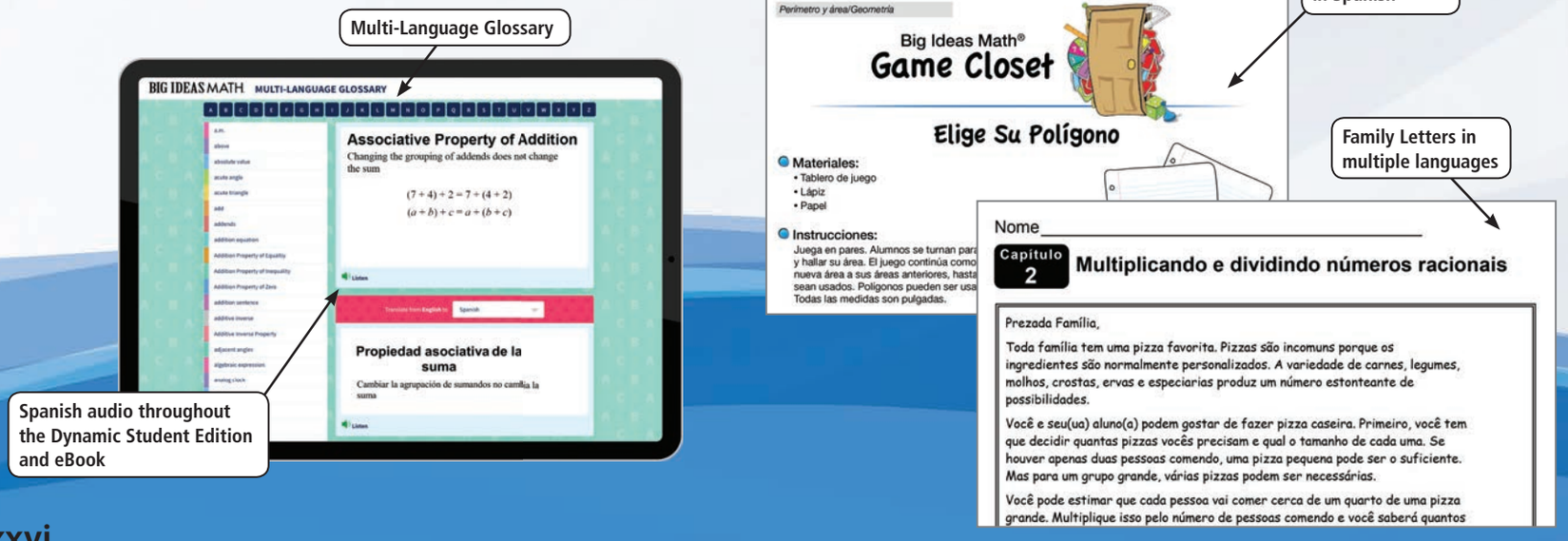
- Clarify language that may be difficult or confusing for ELL students
- Connect new learning to something students already know
- Differentiate student comprehension while completing practice exercises
- Target Beginner, Intermediate, and Advanced ELL students, which correspond to **WIDA** reading, writing, speaking, and listening language mastery levels

Practice Language and Content

- Practice math while improving language skills
- Use language as a resource to develop procedural fluency

Assess Understanding

- Check for development of mathematical reasoning
- Informally assess student comprehension of concepts

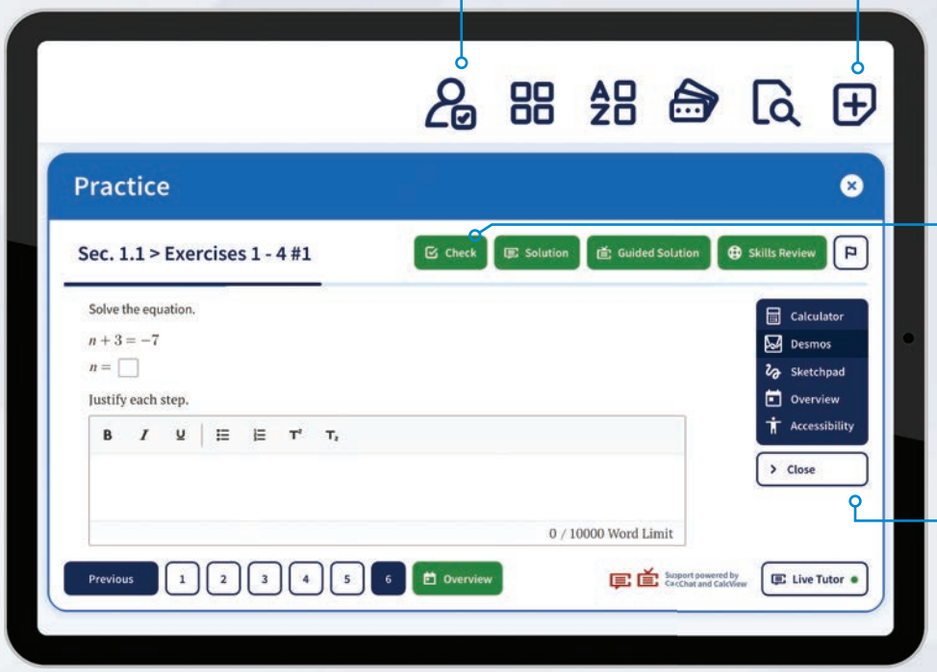


Students Get the Support They Need, When They Need It

There will be times throughout this course when students may need help. Whether they missed a section, did not understand the content, or just want to review, they can take advantage of the resources provided to them in the *Dynamic Student Edition*.

Students use the **Self-Assessment** tool to keep track of their understanding of the section's Learning Target and Success Criteria.

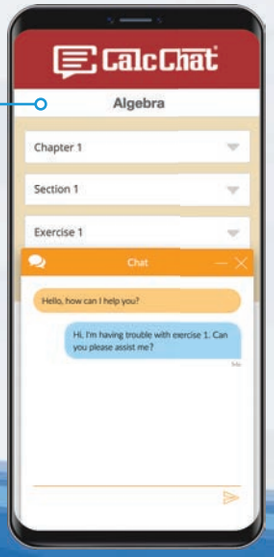
Students can take notes throughout the section using the **My Notes** function. These notes will be organized for them by chapter and section.

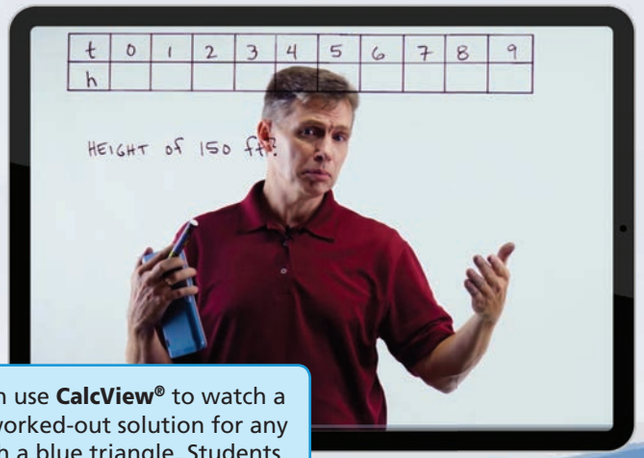


Students **Check** their answers to selected exercises as they work through the section. They can use the **Help** option to view the Digital Example and Extra Example videos.

Support your students as they use the available **tools** to help clearly show their work and demonstrate their math knowledge.

Students can use **CalcChat®** to view worked-out solutions for select exercises. They can also chat with a live tutor.





Students can use **CalcView®** to watch a video of a worked-out solution for any exercise with a blue triangle. Students will hear a teach explain step-by-step how to solve the problem.

Resources at Your Fingertips

This robust, innovative program utilizes a mixture of print and digital resources that allow for a variety of instructional approaches. The program encompasses hands-on activities, interactive explorations, videos, scaffolded instruction, learning support, and many more resources that appeal to students and teachers alike.

PRINT RESOURCES

Student Edition

Teaching Edition

Resources by Chapter

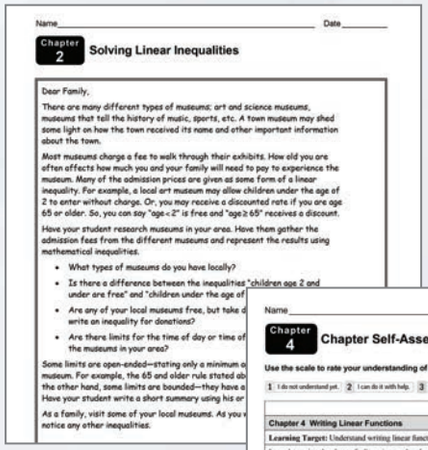
- Family Letter
- Warm-Ups
- Extra Practice
- Reteach
- Enrichment and Extension
- Puzzle Time

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

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

Assessment Book

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


Name_____ Date_____

Chapter 2 Solving Linear Inequalities

Dear Family,

There are many different types of museums: art and science museums, museums that tell the history of music, sports, etc. A town museum may shed some light on how the town received its name and other important information about the town.

Most museums charge a fee to walk through their exhibits. How old you are often affects how much you and your family will need to pay to experience the museum. Many of the admission prices are given as some form of a linear inequality. For example, a local art museum may allow children under the age of 2 to enter without charge. Or, you may receive a discounted rate if you are age 65 or older. So, you can say "age < 2" is free and "age ≥ 65" receives a discount.

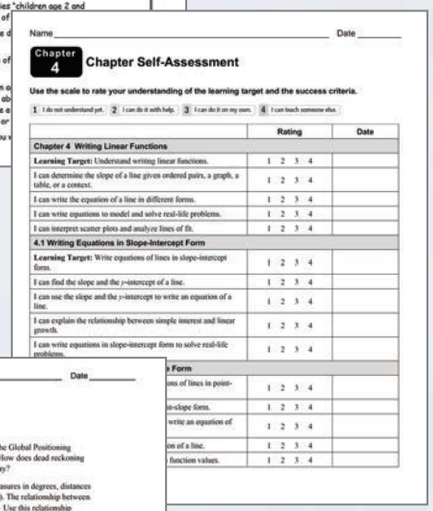
Have your student research museums in your area. Have them gather the admission fees from the different museums and represent the results using mathematical inequalities.

- What types of museums do you have locally?
- Is there a difference between the inequalities "children age 2 and under are free" and "children under the age of
- Are any of your local museums free, but take d write an inequality for donations?
- Are there limits for the time of day or time of the museums in your area?

Some limits are open-ended—stating only a minimum o museum. For example, the 65 and older rule stated ab the other hand, some limits are bounded—they have a Have your student write a short summary using his or

As a family, visit some of your local museums. As you notice any other inequalities.

Resources by Chapter


Name_____ Date_____

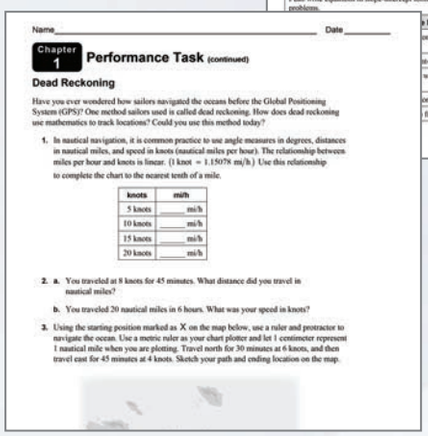
Chapter 4 Chapter Self-Assessment

Use the scale to rate your understanding of the learning target and the success criteria.

1 I do not understand yet. 2 I can do it with help. 3 I can do it on my own. 4 I can teach someone else.

	Rating	Date
Chapter 4 Writing Linear Functions		
Learning Target: Understand writing linear functions.	1 2 3 4	
I can determine the slope of a line given ordered pairs, a graph, a table, or a context.	1 2 3 4	
I can write the equation of a line in different forms.	1 2 3 4	
I can write equations to model and solve real-life problems.	1 2 3 4	
I can interpret scatter plots and analyze lines of fit.	1 2 3 4	
4.1 Writing Equations in Slope-Intercept Form		
Learning Target: Write equations of lines in slope-intercept form.	1 2 3 4	
I can find the slope and the y-intercept of a line.	1 2 3 4	
I can use the slope and the y-intercept to write an equation of a line.	1 2 3 4	
I can explain the relationship between simple interest and linear growth.	1 2 3 4	
I can write equations in slope-intercept form to solve real-life problems.	1 2 3 4	

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


Name_____ Date_____

Chapter 1 Performance Task (continued)

Dead Reckoning

Have you ever wondered how sailors navigated the oceans before the Global Positioning System (GPS)? One method sailors used is called dead reckoning. How does dead reckoning use mathematics to track locations? Could you use this method today?

1. In nautical navigation, it is common practice to use angle measures in degrees, distances in nautical miles, and speed in knots (nautical miles per hour). The relationship between miles per hour and knots is linear. (1 knot ≈ 1.15078 mi/h) Use this relationship to complete the chart to the nearest tenth of a mile.

knots	mi/h
5 knots	_____ mi/h
10 knots	_____ mi/h
15 knots	_____ mi/h
20 knots	_____ mi/h

2. a. You traveled at 8 knots for 45 minutes. What distance did you travel in nautical miles?

   b. You traveled 20 nautical miles in 6 hours. What was your speed in knots?

3. Using the starting position marked as X on the map below, use a ruler and protractor to navigate the ocean. Use a metric ruler as your chart plotter and let 1 centimeter represent 1 nautical mile when you are plotting. Travel north for 30 minutes at 6 knots, and then travel east for 45 minutes at 4 knots. Sketch your path and ending location on the map.

Assessment Book

Through Program Resources

TECHNOLOGY RESOURCES

Dynamic Student Edition

- Interactive Tools
- Interactive Explorations
- Digital Examples
- Extra Example Videos
- Self-Assessments

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

Resources

- Answer Presentation Tool
- CalcChat® and CalcView®
- Skills Trainer
- Vocabulary Flash Cards
- STEM Videos
- STEM Performance Tasks
- Game Library
- Multi-Language Glossary
- Lesson Plans
- Differentiating the Lesson
- Graphic Organizers
- Pacing Guide
- Worked-Out Solutions Key
- Math Tool Paper
- Family Letters
- Homework App
- Skills Review Handbook

Dynamic Assessment System

- Practice
- Assessments
- Progression Benchmark Tests
- Detailed Reports

Video Support for Teachers

- Everyday Connections Videos
- Everyday Explorations Videos
- Professional Development Videos
- Concepts and Tools Videos

Benchmark Code	Benchmark	Algebra 1
Number Sense and Operations		
MA.912.NSO.1.1	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.	**6.2, 9.4**
MA.912.NSO.1.2	Generate equivalent algebraic expressions using the properties of exponents.	**6.1,** 6.4, 7.2, 7.3
MA.912.NSO.1.4	Apply previous understanding of operations with rational numbers to add, subtract, multiply and divide numerical radicals.	**9.1**
Algebraic Reasoning		
MA.912.AR.1.1	Identify and interpret parts of an equation or expression that represent a quantity in terms of a mathematical or real-world context, including viewing one or more of its parts as a single entity.	1.2, 2.5, 4.1, **6.4,** 7.1, 7.3, 7.7
MA.912.AR.1.2	Rearrange equations or formulas to isolate a quantity of interest.	**1.5,** 3.5, 3.6, 4.2, 6.5, 7.4, 8.3, 8.4, 8.5, **9.3,** 9.5
MA.912.AR.1.3	Add, subtract and multiply polynomial expressions with rational number coefficients.	5.2, 5.3, 5.4, **7.1, 7.2, 7.3,** 7.5, 7.8, 8.5, 8.7
MA.912.AR.1.4	Divide a polynomial expression by a monomial expression with rational number coefficients.	**7.2**
MA.912.AR.1.7	Rewrite a polynomial expression as a product of polynomials over the real number system.	**7.4, 7.5, 7.6, 7.7, 7.8,** 8.5, 9.4, 9.5
MA.912.AR.2.1	Given a real-world context, write and solve one-variable multi-step linear equations.	**1.1, 1.2, 1.3,** 1.5, 3.4, 3.5, 3.6, 5.2, 5.3, 5.4, **5.5,** 7.6, 7.7, 8.4
MA.912.AR.2.2	Write a linear two-variable equation to represent the relationship between two quantities from a graph, a written description or a table of values within a mathematical or real-world context.	3.1, **4.1, 4.2, 4.3, 4.4,** 4.5, **5.1, 5.2, 5.3, 5.4, 5.5**
MA.912.AR.2.3	Write a linear two-variable equation for a line that is parallel or perpendicular to a given line and goes through a given point.	**4.4**
MA.912.AR.2.4	Given a table, equation or written description of a linear function, graph that function, and determine and interpret its key features.	3.1, **3.2, 3.3, 3.4, 3.5, 3.6, 3.7,** 4.1, **4.2, 4.3,** 5.1, 5.4, 5.5
MA.912.AR.2.5	Solve and graph mathematical and real-world problems that are modeled with linear functions. Interpret key features and determine constraints in terms of the context.	**3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7,** 5.1, 5.2, 5.3, 5.4, 5.5

Boldface indicates a section in which the benchmark is a primary focus.

Mathematics Correlated to Algebra 1

Benchmark Code	Benchmark	Algebra 1
MA.912.AR.2.6	Given a mathematical or real-world context, write and solve one-variable linear inequalities, including compound inequalities. Represent solutions algebraically or graphically.	**2.1, 2.2, 2.3, 2.4, 2.5,** 2.6
MA.912.AR.2.7	Write two-variable linear inequalities to represent relationships between quantities from a graph or a written description within a mathematical or real-world context.	**5.6, 5.7**
MA.912.AR.2.8	Given a mathematical or real-world context, graph the solution set to a two-variable linear inequality.	**5.6, 5.7**
MA.912.AR.3.1	Given a mathematical or real-world context, write and solve one-variable quadratic equations over the real number system.	**7.4, 7.5, 7.6, 7.7, 7.8,** 8.5, **9.2, 9.3, 9.4, 9.5**
MA.912.AR.3.4	Write a quadratic function to represent the relationship between two quantities from a graph, a written description or a table of values within a mathematical or real-world context.	**8.8,** 9.3
MA.912.AR.3.5	Given the *x*-intercepts and another point on the graph of a quadratic function, write the equation for the function.	**8.8**
MA.912.AR.3.6	Given an expression or equation representing a quadratic function, determine the vertex and zeros and interpret them in terms of a real-world context.	7.4, 7.5, 7.6, 7.7, 7.8, **8.1, 8.2, 8.3, 8.4, 8.5,** 8.8, **9.2, 9.3, 9.4, 9.5**
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.	**3.2, 8.1, 8.2, 8.3, 8.4, 8.5,** 8.7, 8.8, **9.2**
MA.912.AR.3.8	Solve and graph mathematical and real-world problems that are modeled with quadratic functions. Interpret key features and determine constraints in terms of the context.	**3.2, 8.1, 8.2, 8.3, 8.4, 8.5,** 8.8, **9.2,** 9.3, **9.4, 9.5**
MA.912.AR.4.1	Given a mathematical or real-world context, write and solve one-variable absolute value equations.	**1.4,** 3.8
MA.912.AR.4.2 H	Given a mathematical or real-world context, write and solve one-variable absolute value inequalities. Represent solutions algebraically or graphically.	**2.6**
MA.912.AR.4.3	Given a table, equation or written description of an absolute value function, graph that function and determine its key features.	**3.8**
MA.912.AR.5.3	Given a mathematical or real-world context, classify an exponential function as representing growth or decay.	**6.4,** 6.5

Boldface indicates a section in which the benchmark is a primary focus.

Benchmark Code	Benchmark	Algebra 1
MA.912.AR.5.4	Write an exponential function to represent a relationship between two quantities from a graph, a written description or a table of values within a mathematical or real-world context.	**6.4, 6.5**
MA.912.AR.5.6	Given a table, equation or written description of an exponential function, graph that function and determine its key features.	**6.3,** 6.4, 8.7
MA.912.AR.9.1	Given a mathematical or real-world context, write and solve a system of two-variable linear equations algebraically or graphically.	**5.1, 5.2, 5.3, 5.4,** 5.5
MA.912.AR.9.4	Graph the solution set of a system of two-variable linear inequalities.	**5.7**
MA.912.AR.9.6	Given a real-world context, represent constraints as systems of linear equations or inequalities. Interpret solutions to problems as viable or non-viable options.	**5.1, 5.2, 5.3, 5.4,** 5.5, **5.7**
Functions		
MA.912.F.1.1	Given an equation or graph that defines a function, determine the function type. Given an input-output table, determine a function type that could represent it.	**3.3, 6.3, 6.4,** 6.5, **8.6,** 8.7
MA.912.F.1.2	Given a function represented in function notation, evaluate the function for an input in its domain. For a real-world context, interpret the output.	**3.4,** 6.3, 6.5, 8.1, 8.2, 8.3, 8.4, 8.5, 8.7, 9.2
MA.912.F.1.3	Calculate and interpret the average rate of change of a real-world situation represented graphically, algebraically or in a table over a specified interval.	**8.7**
MA.912.F.1.5	Compare key features of linear functions each represented algebraically, graphically, in tables or written descriptions.	3.3, **3.4,** 3.6, 4.1, 4.2
MA.912.F.1.6	Compare key features of linear and nonlinear functions each represented algebraically, graphically, in tables or written descriptions.	**3.2,** 6.3, 6.4, 6.5, **8.3, 8.7**
MA.912.F.1.8	Determine whether a linear, quadratic or exponential function best models a given real-world situation.	6.3, 6.4, 6.5, 8.6, 8.7, **8.8**
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.	**3.7, 3.8, 8.1, 8.2,** 8.3, **8.4,** 8.5
MA.912.F.2.3 H	Given the graph or table of $f(x)$ and the graph or table of $f(x) + k$, $kf(x)$, $f(kx)$ and $f(x + k)$, state the type of transformation and find the value of the real number k.	**3.7, 3.8, 8.4**
MA.912.F.3.1 H	Given a mathematical or real-world context, combine two functions, limited to linear and quadratic, using arithmetic operations. When appropriate, include domain restrictions for the new function.	**8.2, 8.7**

Boldface indicates a section in which the benchmark is a primary focus.

Mathematics Correlated to Algebra 1 (continued)

Benchmark Code	Benchmark	Algebra 1
	Financial Literacy	
MA.912.FL.3.2	Solve real-world problems involving simple, compound and continuously compounded interest.	**1.5, 4.1, 6.5**
MA.912.FL.3.4	Explain the relationship between simple interest and linear growth. Explain the relationship between compound interest and exponential growth and the relationship between continuously compounded interest and exponential growth.	**4.1, 6.5**
	Data Analysis and Probability	
MA.912.DP.1.1	Given a set of data, select an appropriate method to represent the data, depending on whether it is numerical or categorical data and on whether it is univariate or bivariate.	**10.1, 10.2,** 10.3
MA.912.DP.1.2	Interpret data distributions represented in various ways. State whether the data is numerical or categorical, whether it is univariate or bivariate and interpret the different components and quantities in the display.	**10.1, 10.2,** 10.3
MA.912.DP.1.3	Explain the difference between correlation and causation in the contexts of both numerical and categorical data.	**4.6, 10.2**
MA.912.DP.1.4	Estimate a population total, mean or percentage using data from a sample survey; develop a margin of error through the use of simulation.	**10.4**
MA.912.DP.2.4	Fit a linear function to bivariate numerical data that suggests a linear association and interpret the slope and y-intercept of the model. Use the model to solve real-world problems in terms of the context of the data.	**4.5,** 4.6, **4.7**
MA.912.DP.2.5 H	Given a scatter plot that represents bivariate numerical data, assess the fit of a given linear function by plotting and analyzing residuals.	**4.6**
MA.912.DP.2.6	Given a scatter plot with a line of fit and residuals, determine the strength and direction of the correlation. Interpret strength and direction within a real-world context.	**4.6**
MA.912.DP.3.1	Construct a two-way frequency table summarizing bivariate categorical data. Interpret joint and marginal frequencies and determine possible associations in terms of a real-world context.	**10.2**
MA.912.DP.3.2 H	Given marginal and conditional relative frequencies, construct a two-way relative frequency table summarizing categorical bivariate data.	**10.3**
MA.912.DP.3.3 H	Given a two-way relative frequency table or segmented bar graph summarizing categorical bivariate data, interpret joint, marginal and conditional relative frequencies in terms of a real-world context.	**10.3**

Boldface indicates a section in which the benchmark is a primary focus.

Suggested Pacing

Chapters 1–10 149 Days (Regular) 153 Days (Honors)

	Regular	Honors
Chapter 1	(14 Days)	(14 Days)
Chapter Opener	1 Day	1 Day
Section 1.1	2 Days	2 Days
Section 1.2	2 Days	2 Days
Section 1.3	2 Days	2 Days
Section 1.4	2 Days	2 Days
Section 1.5	3 Days	3 Days
Chapter Review/ Chapter Test	1 Day	1 Day
Performance Task	1 Day	1 Day
Year-To-Date	**14 Days**	**14 Days**
Chapter 2	(9 Days)	(11 Days)
Chapter Opener	1 Day	1 Day
Section 2.1	2 Days	2 Days
Section 2.2	1 Day	1 Day
Section 2.3	1 Day	1 Day
Section 2.4	1 Day	1 Day
Section 2.5	1 Day	1 Day
Section 2.6	0 Days	2 Days
Chapter Review/ Chapter Test	1 Day	1 Day
Performance Task	1 Day	1 Day
Year-To-Date	**23 Days**	**25 Days**
Chapter 3	(20 Days)	(20 Days)
Chapter Opener	1 Day	1 Day
Section 3.1	2 Days	2 Days
Section 3.2	1 Day	1 Day
Section 3.3	3 Days	3 Days
Section 3.4	1 Day	1 Day
Section 3.5	2 Days	2 Days
Section 3.6	3 Days	3 Days
Section 3.7	3 Days	3 Days
Section 3.8	2 Days	2 Days
Chapter Review/ Chapter Test	1 Day	1 Day
Performance Task	1 Day	1 Day
Year-To-Date	**43 Days**	**45 Days**

	Regular	Honors
Chapter 4	(16 Days)	(16 Days)
Chapter Opener	1 Day	1 Day
Section 4.1	2 Days	2 Days
Section 4.2	2 Days	2 Days
Section 4.3	2 Days	2 Days
Section 4.4	2 Days	2 Days
Section 4.5	1 Day	1 Day
Section 4.6	2 Days	2 Days
Section 4.7	2 Days	2 Days
Chapter Review/ Chapter Test	1 Day	1 Day
Performance Task	1 Day	1 Day
Year-To-Date	**59 Days**	**61 Days**
Chapter 5	(14 Days)	(14 Days)
Chapter Opener	1 Day	1 Day
Section 5.1	1 Day	1 Day
Section 5.2	2 Days	2 Days
Section 5.3	2 Days	2 Days
Section 5.4	2 Days	2 Days
Section 5.5	1 Day	1 Day
Section 5.6	1 Day	1 Day
Section 5.7	2 Days	2 Days
Chapter Review/ Chapter Test	1 Day	1 Day
Performance Task	1 Day	1 Day
Year-To-Date	**73 Days**	**75 Days**
Chapter 6	(15 Days)	(15 Days)
Chapter Opener	1 Day	1 Day
Section 6.1	2 Days	2 Days
Section 6.2	2 Days	2 Days
Section 6.3	3 Days	3 Days
Section 6.4	3 Days	3 Days
Section 6.5	2 Days	2 Days
Chapter Review/ Chapter Test	1 Day	1 Day
Performance Task	1 Day	1 Day
Year-To-Date	**88 Days**	**90 Days**

Chapter 7

	Regular	Honors
	(17 Days)	(17 Days)
Chapter Opener	1 Day	1 Day
Section 7.1	2 Days	2 Days
Section 7.2	2 Days	2 Days
Section 7.3	1 Day	1 Day
Section 7.4	1 Day	1 Day
Section 7.5	2 Days	2 Days
Section 7.6	2 Days	2 Days
Section 7.7	2 Days	2 Days
Section 7.8	2 Days	2 Days
Chapter Review/ Chapter Test	1 Day	1 Day
Performance Task	1 Day	1 Day
Year-To-Date	**105 Days**	**107 Days**

Chapter 8

	Regular	Honors
	(19 Days)	(19 Days)
Chapter Opener	1 Day	1 Day
Section 8.1	1 Day	1 Day
Section 8.2	1 Day	1 Day
Section 8.3	2 Days	2 Days
Section 8.4	2 Days	2 Days
Section 8.5	3 Days	3 Days
Section 8.6	2 Days	2 Days
Section 8.7	3 Days	3 Days
Section 8.8	2 Days	2 Days
Chapter Review/ Chapter Test	1 Day	1 Day
Performance Task	1 Day	1 Day
Year-To-Date	**124 Days**	**126 Days**

Chapter 9

	Regular	Honors
	(16 Days)	(16 Days)
Chapter Opener	1 Day	1 Day
Section 9.1	3 Days	3 Days
Section 9.2	3 Days	3 Days
Section 9.3	1 Day	1 Day
Section 9.4	3 Days	3 Days
Section 9.5	3 Days	3 Days
Chapter Review/ Chapter Test	1 Day	1 Day
Performance Task	1 Day	1 Day
Year-To-Date	**140 Days**	**142 Days**

Chapter 10

	Regular	Honors
	(9 Days)	(11 Days)
Chapter Opener	1 Day	1 Day
Section 10.1	1 Day	1 Day
Section 10.2	2 Days	2 Days
Section 10.3	0 Days	2 Days
Section 10.4	3 Days	3 Days
Chapter Review/ Chapter Test	1 Day	1 Day
Performance Task	1 Day	1 Day
Year-To-Date	**149 Days**	**153 Days**

An editable version of the Suggested Pacing is available at *BigIdeasMath.com*.

1 Solving Linear Equations

Water Conservation
Make a plan to conserve water in your own daily life.

Solving Linear Inequalities

2

Mountaineering

Assume the role of an expedition leader and use inequalities to track the progress of climbers on Mount Everest.

H means the entire section is honors.

H means that the section contains honors content.

3 Graphing Linear Functions

Scuba Diving

Plan a dive by selecting a tank size, depth, and the amount of time you will spend underwater.

H means the entire section is honors.

H means that the section contains honors content.

Writing Linear Functions

4

Renewable Energy

Write a proposal for a new wind farm in your community, detailing the size, cost, and energy production of the farm.

H means the entire section is honors.

H means that the section contains honors content.

5 Solving Systems of Linear Equations

Deep Ocean Exploration
Plan an expedition to the Challenger Deep, including a dive schedule and goals that you hope to accomplish.

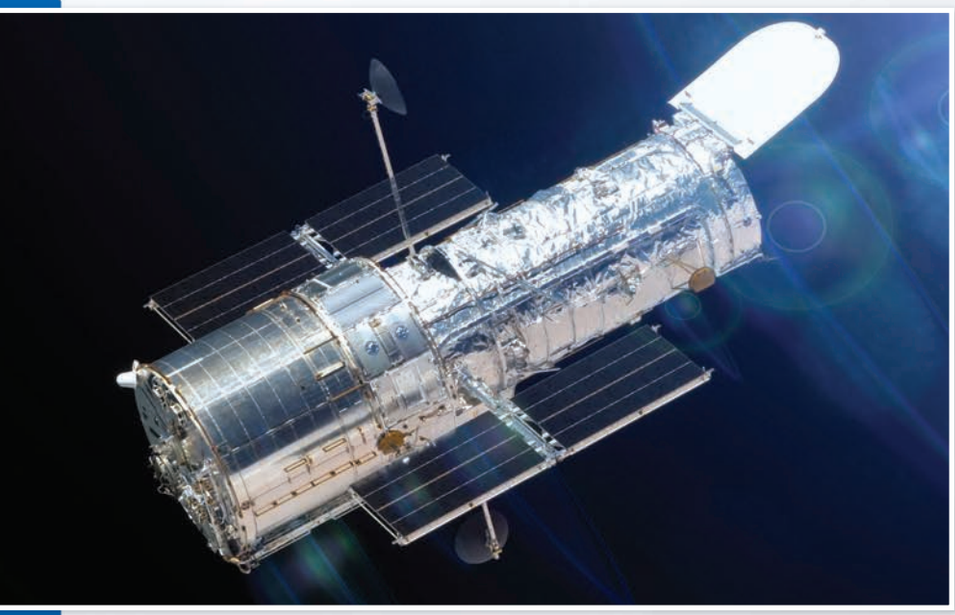
Exponential Functions

6

Bacterial and Viral Growth

Write a report for a health organization, forecasting the spread of an Ebola epidemic and recommending steps that can be taken to slow its spread.

7 Polynomial Equations and Factoring



Astronomy

Create a display that demonstrates how gravity affects objects on each planet in our solar system.

Graphing Quadratic Functions

8

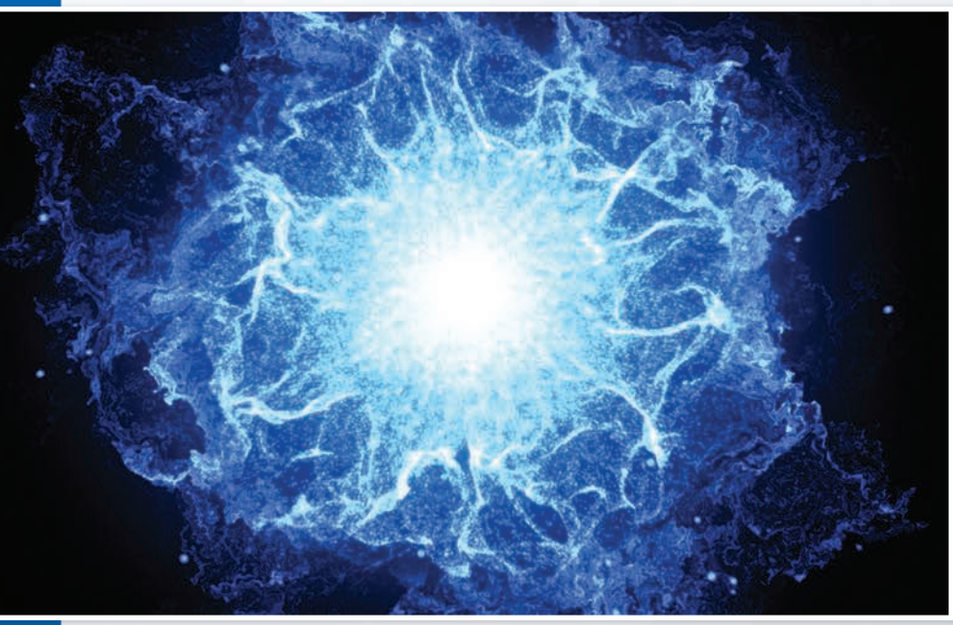
Wildlife Conservation

Analyze sea turtle nesting trends in a region. Write a report that includes methods to increase the population.

H means the entire section is honors.

H means that the section contains honors content.

9 Solving Quadratic Equations



Cosmology

Use a quadratic equation to show the relationship among a star's *luminosity*, *apparent brightness*, and distance from Earth.

Data Analysis and Displays

10

Additional Resources

Robotics

Conduct a survey about the use of robotics in everyday life, analyze the data, and use data displays to create a presentation of your findings.

H means the entire section is honors.

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