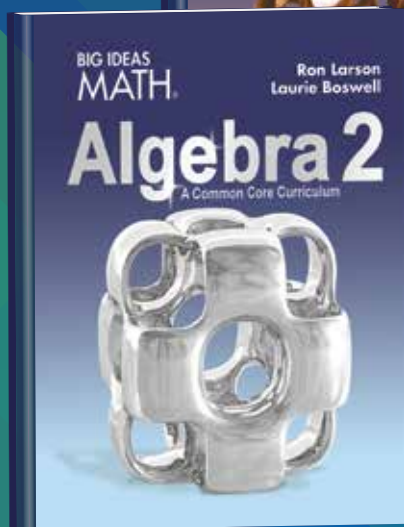
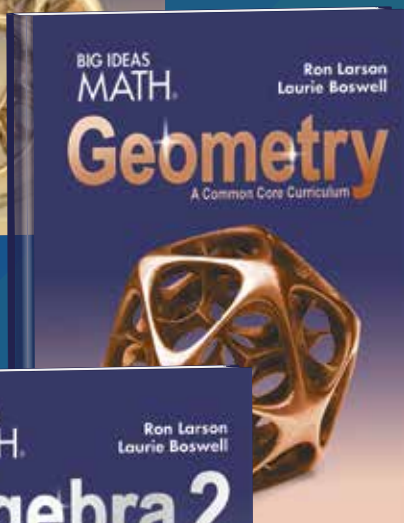
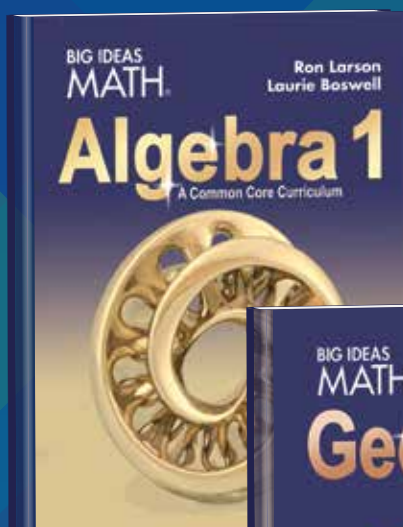


BIG IDEAS MATH[®]

Ron Larson
Laurie Boswell



High School



A COMMON CORE
CURRICULUM

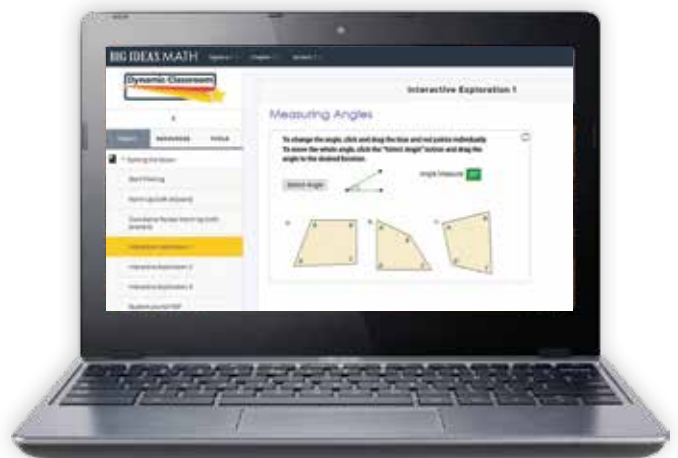


Empower Learning with *Big Ideas Math*

Designed to the Common Core State Standards, ***Big Ideas Math***® ***Algebra 1***, ***Geometry***, and ***Algebra 2*** is a robust and research-based program that uses the Standards for Mathematical Practice as its foundation. It ensures that students not only grasp key mathematical concepts, but enjoy making connections between concepts and the world around them.

Create Confident Learners With:

- Dynamic Technology for the 21st-Century Classroom
- Complete Support for Teachers in Lesson Planning and Lesson Presentation
- Dynamic Assessment System
- Research-Based Content and Delivery
- Rigorous, Focused, and Coherent Curriculum
- Balanced Approach to Instruction
- Continuous Preparation for High-Stakes Assessment
- Embedded RTI, Differentiated Instruction, and ELL Support



PANTHERA TIGRIS SUMATRAE *White Tiger*

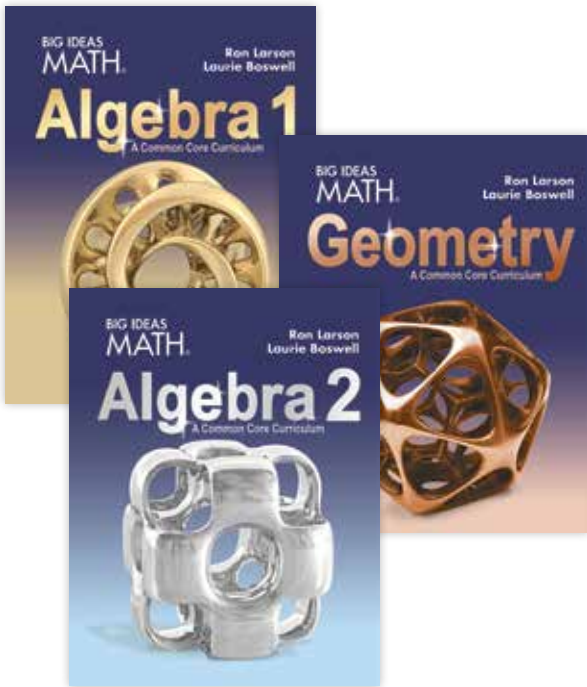
COVER: The Sumatran tiger (*Panthera tigris sumatrae*) is a rare tiger subspecies that inhabits the Indonesian island of Sumatra. It was classified as critically endangered by IUCN in 2008 as the population was estimated at 441 to 679 individuals, with no subpopulation larger than 50 individuals and a declining trend.

<http://www.nationalgeographic.com.au/natgeosnap/18544-panthera-tigris-sumatrae.aspx>

PHOTO CREDIT: MirasWonderland/ iStock by Getty Images

Expert Authors

The **Big Ideas Math** authors are dedicated to fostering curiosity and confidence in learners.



Dr. Larson and Dr. Boswell began writing together in 1992. Since that time, they have authored over three dozen textbooks. In their collaboration, Ron is primarily responsible for the Student Edition while Laurie is primarily responsible for the Teaching Edition.



Ron Larson, Ph.D., is well known as the lead author of a comprehensive program for mathematics that spans middle school, high school, and college courses. 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's numerous professional activities keep him actively involved in the mathematics education community and allow him to fully understand the needs of students, teachers, supervisors, and administrators.



Laurie Boswell, Ed.D., is the former Head of School at Riverside School in Lyndonville, Vermont. In addition to textbook authoring, 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 is a Tandy Technology Scholar. 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.

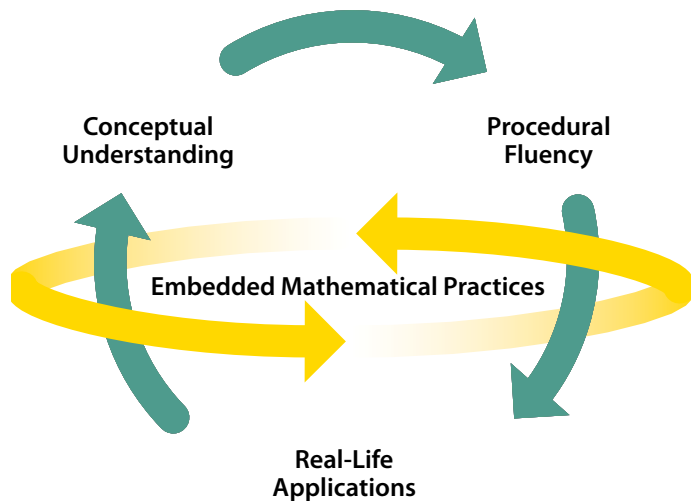
We created Big Ideas Math because we recognized the need for a truly balanced approach to learning, using discovery learning and scaffolded instruction.

—Ron Larson, Ph.D.

Big Ideas Math encourages productive struggle. It's not about being hard. The entire program is accessible for all students.

—Laurie Boswell, Ed.D.

Program Philosophy: Rigor and Balance with Embedded Mathematical Practices



The **Big Ideas Math** program balances conceptual understanding with procedural fluency. Real-life applications create connections to content and help turn mathematical learning into an engaging and meaningful way to explore the real world.

Embedded **Mathematical Practices** in grade-level content promote a greater understanding of how mathematical concepts are connected to each other and to real-life scenarios.

Mathematical Practices

Mathematically proficient students use dynamic geometry software strategically.

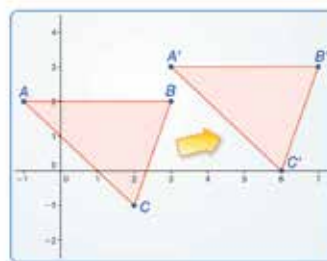
4.1 Translations

Essential Question How can you translate a figure in a coordinate plane?

EXPLORATION 1 Translating a Triangle in a Coordinate Plane

Work with a partner.

- Use dynamic geometry software to draw any triangle and label it $\triangle ABC$.
- Copy the triangle and *translate* (or slide) it to form a new figure, called an *image*, $\triangle A'B'C'$ (read as "triangle A prime, B prime, C prime").
- What is the relationship between the coordinates of the vertices of $\triangle ABC$ and those of $\triangle A'B'C'$?
- What do you observe about the side lengths and angle measures of the two triangles?



Sample

Points
 $A(-1, 2)$
 $B(3, 2)$
 $C(2, -1)$
 Segments
 $AB = 4$
 $BC = 3.16$
 $AC = 4.24$
 Angles
 $m\angle A = 45^\circ$
 $m\angle B = 71.57^\circ$
 $m\angle C = 63.43^\circ$

USING TOOLS STRATEGICALLY

To be proficient in math, you need to use appropriate tools strategically, including dynamic geometry software.

In writing the Activities and Explorations, I wanted to provide ALL students with the opportunity to start them with some success.

—Ron Larson, Ph.D.

4.2 Reflections

Essential Question How can you reflect a figure in a coordinate plane?

EXPLORATION 1 Reflecting a Triangle Using a Reflective Device

Work with a partner. Use a straightedge to draw any triangle on paper. Label it $\triangle ABC$.

- Use the straightedge to draw a line that does not pass through the triangle. Label it m .
- Place a reflective device on line m .
- Use the reflective device to plot the images of the vertices of $\triangle ABC$. Label the images of vertices A , B , and C as A' , B' , and C' , respectively.
- Use a straightedge to draw $\triangle A'B'C'$ by connecting the vertices.



Conceptual Understanding

Explorations and guiding Essential Questions encourage **conceptual understanding**.

4.2 Lesson

What You Will Learn

- ▶ Perform reflections.
- ▶ Perform glide reflections.
- ▶ Identify lines of symmetry.
- ▶ Solve real-life problems involving reflections.

Core Vocabulary

reflection, p. 182
 line of reflection, p. 182
 glide reflection, p. 184
 line symmetry, p. 185
 line of symmetry, p. 185

Performing Reflections

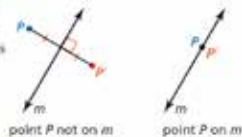
Core Concept

Reflections

A **reflection** is a transformation that uses a line like a mirror to reflect a figure. The mirror line is called the **line of reflection**.

A reflection in a line m maps every point P in the plane to a point P' , so that for each point one of the following properties is true.

- If P is not on m , then m is the perpendicular bisector of PP' , or
- If P is on m , then $P = P'$.



Procedural Fluency

Scaffolded lessons allow for **procedural fluency** and provide the opportunity to use clear, precise mathematical language.

Solving Real-Life Problems

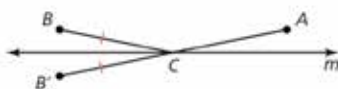
EXAMPLE 6 Finding a Minimum Distance

You are going to buy books. Your friend is going to buy CDs. Where should you park to minimize the distance you both will walk?



SOLUTION

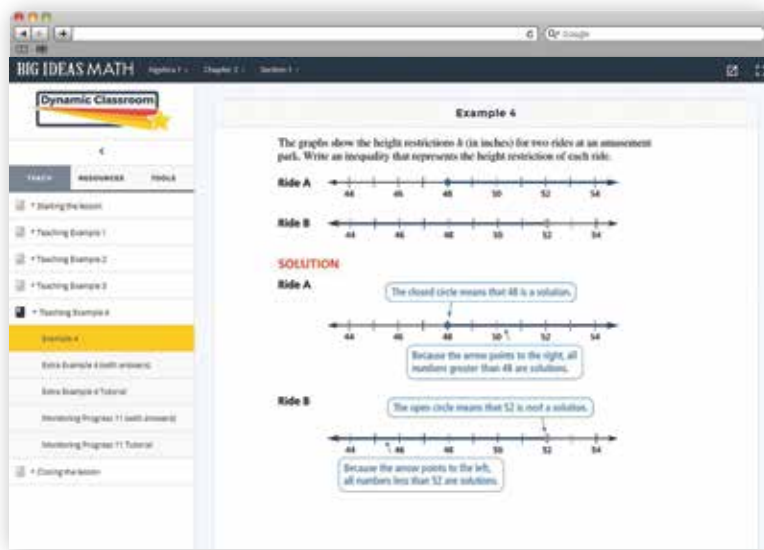
Reflect B in line m to obtain B' . Then draw AB' . Label the intersection of AB' and m as C . Because AB' is the shortest distance between A and B' and $BC = B'C$, park at point C to minimize the combined distance, $AC + BC$, you both have to walk.



Real-Life Applications

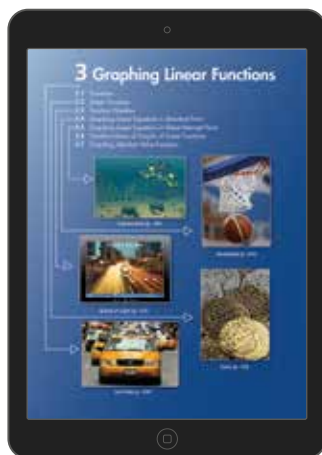
Real-life applications provide students with opportunities to create connections between classroom lessons and realistic scenarios.

Ignite Learning with Dynamic Technology



Dynamic Classroom

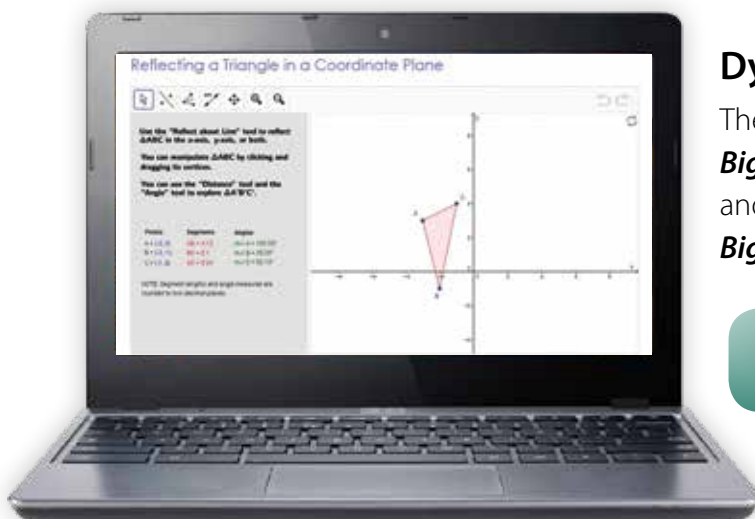
The **Dynamic Classroom** is a digital lesson presentation tool built to engage students. Teachers can progress through each lesson from opening to closing with one simple click. The **Dynamic Classroom** includes daily lesson resources like the **Dynamic Investigations** and Student Journal, as well as a variety of interactive teaching tools.



Student Dynamic eBook

The **Student Dynamic eBook** is a complete electronic version of the Student Edition that includes interactive digital resources. The eBook allows students to navigate through the textbook, highlight important information, and add notes or bookmarks. While this eBook is available off-line, with a data or internet connection, students can access embedded, digital enhancements.

Audio available in English and Spanish



Dynamic Investigations

The **Dynamic Investigations** in the **Big Ideas Math** program allow students and teachers to interactively complete the **Big Ideas Math** explorations.

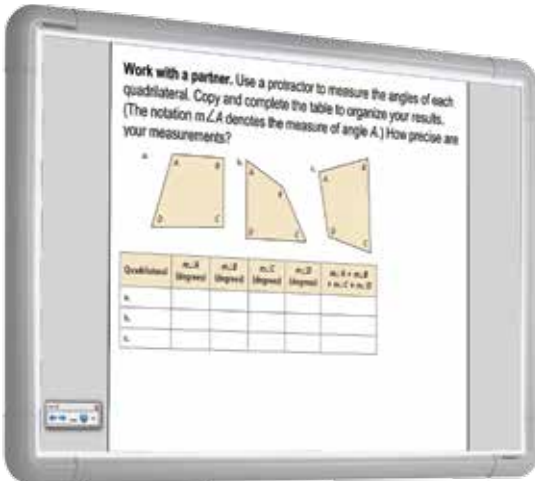
**CREATE CONNECTIONS
THROUGH EXPLORATION!**



Real-Life STEM Videos

Every chapter in the *Big Ideas Math* program contains a **Real-Life STEM Video** allowing students to further engage with mathematical concepts. Students learn about the Parthenon, natural disasters, solar power, and more!

ENCOURAGE CURIOSITY WITH STEM CONCEPTS!



Dynamic Teaching Tools

These tools feature the *Interactive Whiteboard Lesson Library*. Teachers can present any *Big Ideas Math* lesson from an interactive whiteboard. Standard whiteboard lessons and customizable templates are included.

VISUALLY RICH PRESENTATIONS!

Dynamic Assessment System

The **Dynamic Assessment System** allows teachers to track and evaluate their students' advancement through the curriculum. Developed exclusively for *Big Ideas Math*, this technology provides teachers and students an intuitive and state-of-the-art tool to help students effectively learn mathematics. Built for ease of use, the tool is available on a wide range of devices.

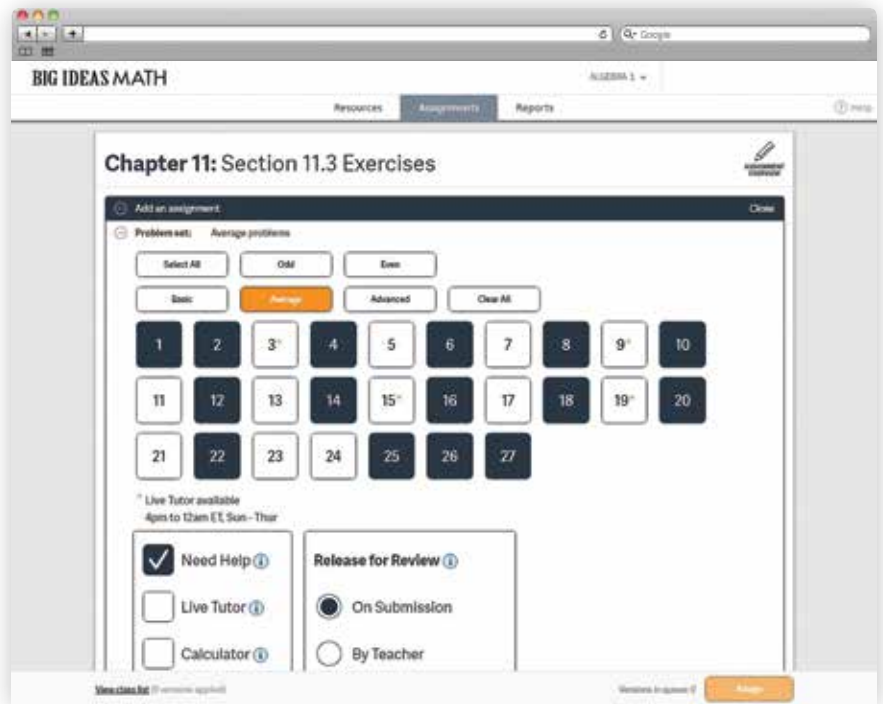


The *Big Ideas Math* Dynamic Assessment System

Homework and Assessment That Informs

- Includes multiple, customizable assignments for each chapter
- Assign homework and assessments for the entire class or a select group of students
- Offers progress monitoring assessments for an adaptive testing experience

RESTORE STUDENT CONFIDENCE!

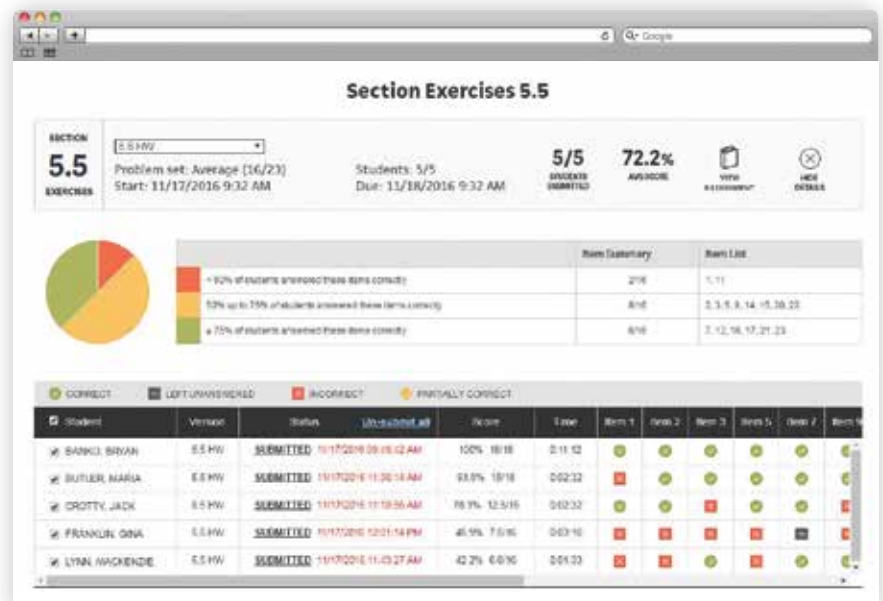


Direct Ties to Remediation

- Includes direct links to Lesson Tutorial Videos and relevant lesson sections
- Allows students to access live chat tutors for selected exercises

Assessment Reporting with Precision

- Offers real-time reporting at both the class and student levels
- Tracks progress through Assignment Performance, Remediation, and Standards reports.



*Formative practice has to have feedback and action.
Use assessments to drive instructional decisions.*

—Laurie Boswell, Ed. D.

Assessment Delivery

- Provides embedded tools for students
- Includes auto-scored, technology-enhanced items such as drag and drop, graphing, point plotting, multiple select, and fill in the blank using math expressions
- Allows teachers to include reminders or notes to students

The screenshot shows a web browser window with the Big Ideas Math logo at the top. The page title is "BIG IDEAS MATH". Below the logo, there is a navigation breadcrumb: "Big Ideas Math 2.2.13 Algebra 1: Common Core Edition - Chapter 11: Measures of Central and Variation - Section Exercises 11.7 - Exercise 18".

The main content area features a bar graph titled "Home Run Statistics". The y-axis is labeled "Number of Home Runs" and ranges from 0 to 14. The x-axis is labeled "Month" and lists the months from April to September. There are two data series: "Last season" (represented by blue bars) and "This season" (represented by orange bars). The bars for "This season" are consistently higher than the bars for "Last season".

Below the graph, there is a question number "18" in a blue box. The question text is: "The graph shows a player's monthly home run totals in two seasons. Find the range of the number of home runs for each season." Below this, there are two input fields: "Range of last season" and "Range this season", each followed by a small square icon. Below these fields is a text input area with the prompt "Compare your results" and a sentence: "The range of last season is [] the range of this season." At the bottom of the input area are three radio buttons labeled "less than", "greater than", and "equal to".

Intuitive Design

- Operates on a wide range of devices with large and clear icons for visibility
- Allows for multiple reporting views through toggle options
- Includes intelligent presets and easy navigation

The screenshot shows a web browser window with the Big Ideas Math logo at the top. The page title is "BIG IDEAS MATH". Below the logo, there is a navigation breadcrumb: "Big Ideas Math 2.2.13 Algebra 1: Common Core Edition - Chapter 8: Proving that a Quadrilateral is a Parallelogram - Section Exercises 8.3 - Exercise 34".

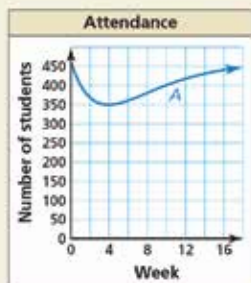
The main content area features a geometry problem. At the top, there is a small image of four cars. Below the image, the text reads: "In the diagram of the parking lot below, $\angle JKL = 60^\circ$, $\angle JKM = 120^\circ$, and $\angle KLM = 60^\circ$." Below this, there is a question number "34" in a blue box. The question text is: "a. Explain how to show that parking space JKLM is a parallelogram." Below this, there is a text input area with a dashed border and a small square icon. Below the input area are three radio buttons labeled "Parallelogram Opposite Sides Congruent", "Parallelogram Opposite Angles Congruent", and "Opposite Sides Parallel and Congruent".

Below the question, there are three sub-questions: "b. Find $m\angle JKL$, $m\angle KLM$, and $m\angle JKM$." Below each sub-question is a text input area with a dashed border and a small square icon. Below the sub-questions, there is a question number "c." followed by the text: "c. $\overline{EK} \perp \overline{JM}$ and $\overline{NO} \perp \overline{PQ}$. Write a theorem that you use to show that $\overline{JK} \parallel \overline{PQ}$." Below this, there is a text input area with a dashed border and a small square icon. At the bottom of the input area are four radio buttons labeled "Vertical Angles Congruent", "Right Angles Congruent", "Vertical Angles Congruent", and "Parallelogram Opposite Sides Congruent".

Preparation for the Journey Toward High-Stakes Testing

Each chapter of the *Big Ideas Math* program features question types frequently found on standardized tests. The balanced approach to instruction also helps students develop the habits of mind required to be successful on high-stakes tests.

34. **HOW DO YOU SEE IT?** The function $y = A(x)$ represents the attendance at a high school x weeks after a flu outbreak. The graph of the function is shown.



- What happens to the school's attendance after the flu outbreak?
- Estimate $A(13)$ and explain its meaning.
- Use the graph to estimate the solution(s) of the equation $A(x) = 400$. Explain the meaning of the solution(s).
- What was the least attendance? When did that occur?
- How many students do you think are enrolled at this high school? Explain your reasoning.

29. **MAKING AN ARGUMENT** Your friend claims the uneven parallel bars in gymnastics are not really parallel. She says one is higher than the other, so they cannot be in the same plane. Is she correct? Explain.



40. **ERROR ANALYSIS** You deposit \$250 in an account that pays 1.25% annual interest. Describe and correct the error in finding the balance after 3 years when the interest is compounded quarterly.

X $A = 250\left(1 + \frac{1.25}{4}\right)^{4 \cdot 3}$
 $A = \$6533.29$

Exercises

The Exercises in the *Big Ideas Math* program provide students with opportunities to use multiple approaches to solve problems.

Dynamic Assessment System

This tool allows teachers to provide customizable homework directly related to the *Big Ideas Math* program. Assignments are automatically scored and students have access to immediate remediation on homework questions.

Explorations

The Explorations that begin each section require students to use higher-level thinking to work through each problem and to explain their reasoning in the solution.

Cumulative Assessments

Each chapter in the *Big Ideas Math* program includes a Cumulative Assessment. The questions in each assessment were carefully chosen to represent problem types and reasoning patterns frequently found on standardized tests.

Quizzes and Tests

The Quizzes and Tests in the *Big Ideas Math* program assess the concepts students learned in each lesson.

Online Test Practice

Self-grading tests are available online, allowing students to receive immediate feedback on their progress.

Performance Tasks

Each chapter of the *Big Ideas Math* program contains a Performance Task in the Assessment Book and an online Performance Task that correlates to the STEM video of the chapter. Each Performance Task allows students to work with multiple standards.

Alternative Assessments

Alternative Assessments provide teachers with the opportunity to assess students on the same content in a variety of ways.

Robust Print Support for All Learners



Student Edition

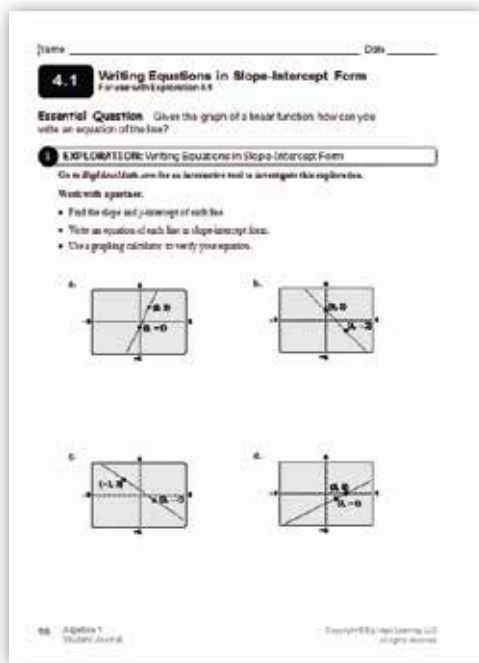
The Student Edition was designed using the Universal Design for Learning Guidelines (CAST © 2011) and features carefully chosen images that increase student engagement and enhance the mathematical content.

Teaching Edition

The Teaching Edition provides teachers with complete support for every **Big Ideas Math** lesson. Master educator Laurie Boswell incorporates instructional insights and recommendations in Laurie's Notes.

Student Journal *Available in English and Spanish*

This consumable workbook serves as a valuable resource where students can solve extra practice problems, take notes, and internalize new concepts by expressing their findings in their own words.



Resources by Chapter

- Start Thinking
 - Warm Up
 - Cumulative Review Warm Up
 - Extra Practice (Practice A and B)
 - Enrichment and Extension
 - Puzzle Time
 - Family Communication Letters
- Available in English and Spanish*

Assessment Book

- Performance Tasks
- Prerequisite Skills Tests with Item Analysis
- Cumulative Tests
- Mid-Chapter Quizzes
- Chapter Tests
- Alternative Assessments with Scoring Rubrics
- Pre-Course Test with Item Analysis
- Post-Course Test with Item Analysis



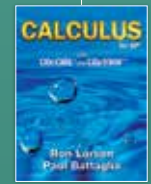
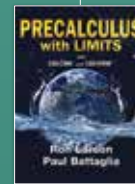
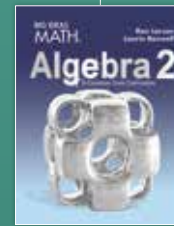
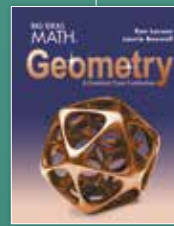
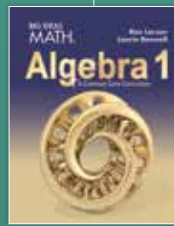
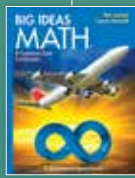
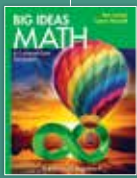
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MIDDLE SCHOOL

HIGH SCHOOL

PRECALCULUS/AP® CALCULUS



Algebra 1

CHAPTERS

- 1 Solving Linear Equations
- 2 Solving Linear Inequalities
- 3 Graphing Linear Functions
- 4 Writing Linear Functions
- 5 Solving Systems of Linear Equations
- 6 Exponential Functions and Sequences
- 7 Polynomial Equations and Factoring
- 8 Graphing Quadratic Functions
- 9 Solving Quadratic Equations
- 10 Radical Functions and Equations
- 11 Data Analysis and Displays

Geometry

CHAPTERS

- 1 Basics of Geometry
- 2 Reasoning and Proofs
- 3 Parallel and Perpendicular Lines
- 4 Transformations
- 5 Congruent Triangles
- 6 Relationships Within Triangles
- 7 Quadrilaterals and Other Polygons
- 8 Similarity
- 9 Right Triangles and Trigonometry
- 10 Circles
- 11 Circumference, Area, and Volume
- 12 Probability

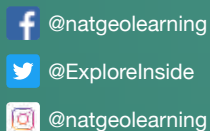
Algebra 2

CHAPTERS

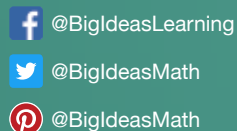
- 1 Linear Functions
- 2 Quadratic Functions
- 3 Quadratic Equations and Complex Numbers
- 4 Polynomial Functions
- 5 Rational Exponents and Radical Functions
- 6 Exponential and Logarithmic Functions
- 7 Rational Functions
- 8 Sequences and Series
- 9 Trigonometric Ratios and Functions
- 10 Probability
- 11 Data Analysis and Statistics

Learn more!

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JUNE/17

