# BIG IDEAS MATH

### Ron Larson Laurie Boswell









### High School



### **Empower Learning with Big Ideas Math**

Developed using consistent, dependable learning and instructional theory, Big Ideas Math<sup>®</sup> Integrated Mathematics I, II, and III, helps students gain a deeper understanding of math concepts by narrowing their focus to fewer topics at each grade level. This research-based curriculum features a continual development of concepts that have been previously taught while integrating algebra, geometry, probability, and statistics topics throughout each course.

### **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



### **Expert Authors**

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



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.

### CERATOTHERIUM SIMUM White Rhinoceros

COVER: The white rhinoceros or square-lipped rhinoceros is the largest extant pecies of rhinoceros. It has a wide mouth used for grazing and is the most social of all rhino species. The white rhinoceros consists of two subspecies: the southern white rhinoceros, and the much rarer northern white rhinoceros. The northerr subspecies had very few remaining, all in captivity.

http://www.nationalgeographic.com/animals/mammals/w/white-rhinoceros/ PHOTO CREDIT: Anankkml / iStock by Getty Images

Big Ideas Math encourages productive struggle. It's not about being hard. The entire program is accessible for all students. —Laurie Boswell, Ed.D.

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.

### **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.





1.5 Lesson	What You Will Learn	n
Core Vocabulary Iteral equation, p. 36 formula, p. 32 Previous surface area	Rewrite and use formulae     Rewrite and use other co     Rewriting Literal Equ An equation that has two or more literal equation, solve for one van     EXAMPLE 1     Rewritin Solve the literal equation 3y + 4	s for area. mmon formulas. uations e variables is called a <b>literal equ</b> iable in terms of the other varia g a Literal Equation x = 9 for y.
	SOLUTION	
	3y + 4x = 9	Write the equation
	3y + 4x - 4x = 9 - 4x	Subtract 4x from each side.
	3y = 9 - 4x	Simplify.
	$\frac{3y}{3} = \frac{9-4x}{3}$	Divide each side by 3.
	$y = 3 - \frac{4}{3}x$	Simplify.
	The rewritten literal equation	n is $y = 3 - \frac{4}{5}x$ ,

#### Solving Real-Life Problems

#### EXAMPLE 4 Modeling with Mathematics

A boat leaves New Orleans and travels upstream on the Mississippi River for 4 hours. The return trip takes only 2.8 hours because the boat travels 3 miles per hour faster ownstream due to the current. How far does the boat travel upstream

#### SOLUTION

- Understand the Problem You are given the amounts of time the boat travels and the difference in speeds for each direction. You are asked to find the distance the boat travels upstream
- Make a Plan Use the Distance Formula to write expressions that represent the problem. Because the distance the boat travels in both directions is the same, you can use the expressions to write an equation
- Solve the Problem Use the formula (distance) = (rate)(time).

Distance upstream = Distance downstream Words

Variable Let x be the speed (in miles per hour) of the hoat traveling upstream

(2)

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.



Explorations and guiding Essential Questions encourage conceptual understanding.



Procedural Fluency

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

Real-Life **Applications** 

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

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## **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.



Work with a partner. Use a protractor to measure the angles of each

(The notation m ZA denotes the measure of angle A.) How precise are

quadrilateral. Copy and complete the table to organize your results.

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!

### **Dynamic 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!** 

### **Dynamic Assessment** System

#### The **Dynamic Assessment**

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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.



### **Real-Life STEM Videos**

ENCOURAGE CURIOSITY WITH STEM CONCEPTS!

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!**

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## The Big Ideas Math Dynamic **Assessment System**

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### 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!**

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### **Multi-Tiered Remediation Channels**

- On-course help through direct links to the appropriate section and Lesson Tutorial Videos
- Pre-course assistance through the Skills Review Handbook
- FREE online chat tutor



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

### **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

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### **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

**All-In-One Reporting** 

• Offers real-time reporting at

both the class and student

• Tracks progress through

Assignment Performance,

Remediation, and Standards

level

reports

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5.5 HW

Problem set: Average Start: 11/17/2016 9:3

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SECTION

5.5

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—Laurie Boswell, Ed. D.

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### **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.



- a. Use the figure to write a formula for the surface area S of the rectangular prism.
- b. Your teacher asks you to rewrite the formula by solving for one of the side lengths, b or  $\ell$ . Which side length would you choose? Explain your reasoning.

57. MAKING AN ARGUMENT In baseball, a player's batting average is calculated by dividing the number of hits by the number of at-bats. The table shows Player A's batting average and number of at-bats for three regular seasons.

Season	Batting average	At-bats
2010	.312	596
2011	.296	446
2012	.295	599

- a. How many hits did Player A have in the 2011 regular season? Round your answer to the nearest whole number.
- b. Player B had 33 fewer hits in the 2011 season than Player A but had a greater batting average. Your friend concludes that Player B had more at-hats in the 2011 season than Player A. Is your friend correct? Explain.



### 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.

### **Ouizzes 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**



### Substitute the given values into the formula. Then solve the execution for h. Jostific each stress

Solve the formula in part (a) for h without first substituting values into the formula. Justify each step.







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### **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
- 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

CONVENIENTLY ACCESS ALL PRINT **COMPONENTS ONLINE AT BIGIDEASMATH.COM!** 

### Count on us for your Larson solutions from Grade 6 through AP®



#### Integrated Mathematics I

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 Data Analysis and Displays
- 8 Basics of Geometry
- 9 Reasoning and Proofs
- 10 Parallel and Perpendicular Lines
- 11 Transformations
- 12 Congruent Triangles

### Integrated Mathematics II

CHAPTERS

- I Functions and Exponents
- 2 Polynomial Equations and Factoring
- 3 Graphing Quadratic Functions
- 4 Solving Quadratic Equations
- 5 Probability
- 6 Relationships Within Triangles
- 7 Quadrilaterals and Other Polygons
- 8 Similarity
- 9 Right Triangles and Trigonometry
- 10 Circles
- 11 Circumference, Area, and Volume

#### Integrated Mathematics III

CHAPTERS

- 1 Geometric Modeling
- 2 Linear and Quadratic Functions
- 3 Polynomial Functions
- 4 Rational Exponents and Radical Functions
- 5 Exponential and Logarithmic Functions
- 6 Rational Functions
- 7 Sequences and Series
- 8 Trigonometric Ratios and Functions
- 9 Trigonometric Identities and Formulas
- 10 Data Analysis and Statistics

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