

# Unit 1 Conditional Probability

Students simulate and collect data, use tree diagrams, two-way tables, and Venn diagrams to represent probability, and investigate the differences between independent and dependent events. Along the way, students examine how probability is used to make decisions in real-world contexts.

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\*This course is in development, so the goals and number of lessons per sub-unit may change slightly.

 **Pre-Unit Check** (Optional)

## Sub-Unit 1 Taking a Chance on Probability

- 1.01 Take a Chance | Probability, Events, and Sample Space
- 1.02 Block Party | Experimental and Theoretical Probabilities
- 1.03 What's Happening? | Sample Spaces and Probability
- 1.04 Two-Way Together | Two-Way Tables and Venn Diagrams
- 1.05 Herding Cats | Exploring Joint Probabilities
- 1.06 Add It Up | Addition Rule for Probabilities

 **Practice Day 1**

 **Sub-Unit Quiz**

## Sub-Unit 2 Independence and Conditional Probability

- 1.07 I-N-D-E-P-E-N-D-E-N-T | Independent and Dependent Events
- 1.08 On One Condition | Conditional Probability
- 1.09 A Given B | Conditional Probability
- 1.10 Counting Everyone, Part 1 | Conditional Probability and Independence
- 1.11 Counting Everyone, Part 2 | Conditional Probability and Independence

 **Practice Day 2**

 **End-of-Unit Assessment**

# Unit 2 Non-Linear Relationships

Students are introduced to quadratic relationships and compare them to linear and exponential relationships. They also explore piecewise-defined and absolute value functions.

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## Pre-Unit Check (Optional)

### Sub-Unit 1 Exploring Non-Linear Relationships

- 2.01 Revisiting Visual Patterns | A New Type of Pattern
- 2.02 Quadratic Visual Patterns | Expressions for Quadratic Patterns
- 2.03 Sorting Relationships | Comparing Linear, Exponential, and Quadratic Relationships
- 2.04 Under the Sea | Key Features in Population Growth
- 2.05 Payday Loan | Revisiting Compound Interest
- 2.06 Credit Card Compounding | Different Compounding Intervals
- 2.07 Predicting Diseases | Linear, Exponential, and Quadratic Modeling

## Practice Day 1

## Sub-Unit Quiz

### Sub-Unit 2 Special Non-Linear Relationships

- 2.08 Pumpkin Prices | Piecewise-Defined Functions, Part 1
- 2.09 Doctor Doctor | Piecewise-Defined Functions, Part 2
- 2.10 What's Your Score? | Absolute Value Functions, Part 1
- 2.11 Absolute Value Machines | Absolute Value Functions, Part 2
- 2.12 Absolute Value Transformations | Transforming Absolute Value Functions
- 2.13 Chip the Robot (Optional) | Inverses, Part 1
- 2.14 Inverse Machines (Optional) | Inverses, Part 2
- 2.15 Non-Linear Inverses | Inverses of Absolute Value and Quadratic Functions

## Practice Day 2

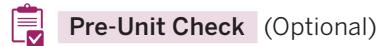
## End-of-Unit Assessment

# Unit 3 Quadratic Relationships

Students analyze graphs, tables, and equations to identify and interpret key features of quadratic functions. They also solve quadratic equations using reasoning, factoring, the zero-product property, and graphing.

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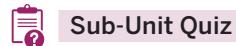
**Pre-Unit Check** (Optional)

## Sub-Unit 1 Representations of Quadratic Functions

- 3.01 On the Fence | Quadratics in Context
- 3.02 Stomp Rockets | Projectiles and Predictions
- 3.03 Plenty of Parabolas | Key Features of Parabolas
- 3.04 Robot Launch | Key Features of Graphs in Context
- 3.05 Get Pump'd | Three Forms of Quadratics
- 3.06 Parabola Zapper | Graphing Parabolas in Factored Form



**Practice Day 1**



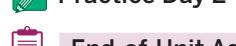
**Sub-Unit Quiz**

## Sub-Unit 2 Multiplying, Factoring, and Solving

- 3.07 Sums and Differences | Adding and Subtracting Linear and Quadratic Expressions
- 3.08 Two-Factor Multiplication | Rewriting Factored-Form Expressions in Standard Form
- 3.09 Standard Feature | Patterns in Factored-Form and Standard-Form Expressions
- 3.10 X-Factor | Factoring Quadratic Expressions
- 3.11 Form Up | More Factoring Quadratic Expressions
- 3.12 Shooting Stars | Determining the  $x$ -Intercepts of Quadratic Functions
- 3.13 Make It Zero | Solving Quadratic Equations Using the Zero-Product Property
- 3.14 Zero, One, or Two? | Solving Equations by Reasoning
- 3.15 Graph to Solve | Solving Quadratic Equations by Graphing



**Practice Day 2**



**End-of-Unit Assessment**

# Unit 4 Quadratic Functions and Complex Numbers

Students convert quadratic expressions between factored, standard, and vertex forms to support them in solving equations and identifying key features of functions. They also solve quadratic equations by completing the square and using the quadratic formula. Students discover the imaginary unit  $i$  and write equivalent expressions involving adding, subtracting, and multiplying complex numbers.

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## Pre-Unit Check (Optional)

### Sub-Unit 1 Vertex Form

- 4.01** Vertex Form | Translating Quadratic Functions
- 4.02** Stretch It Out | Vertical Scales and Vertex Form
- 4.03** Through the Gates | Building Quadratics in Factored Form/Writing Equations of Quadratic Functions
- 4.04** Couldn't Square Less | Solving by Taking the Square Root
- 4.05** Square Dance | Perfect Square Expressions
- 4.06** Square Tactic | Solving by Completing the Square
- 4.07** Just Imagine | Introducing  $i$
- 4.08** Not-So-Complex Numbers | Introducing Complex Numbers
- 4.09** Back and Forth | Rewriting Quadratic Expressions in Vertex Form
- 4.10** Reasonable Rent | Putting It All Together

## Practice Day 1

## Sub-Unit Quiz

### Sub-Unit 2 Complex Numbers and the Quadratic Formula

- 4.11** Formula Foundations | Introducing the Quadratic Formula
- 4.12** Formula Fluency | Solving Quadratic Equations Using the Quadratic Formula
- 4.13** Stomp Rockets in Space | Solving Quadratic Equations in Context
- 4.14** Star Systems | Solving Systems of Linear and Quadratic Equations

## Practice Day 2

### Sub-Unit 3 Operations With Complex Numbers

- 4.15** Sums and Products | Exploring Sums and Products of Rational and Irrational Numbers
- 4.16** Truth or Square | Writing Equivalent Expressions With Complex Numbers
- 4.17** Me, Myself, and  $i$  | Multiplying Complex Numbers
- 4.18** Rewrite and Reimagine | Complex Identities
- 4.19** Thinking Rationally (Optional) | Writing Expressions Using Radicals and Rational Exponents
- 4.20** Writing Radicals (Optional) | Writing Equivalent Expressions Using Rational Exponents and Radicals

## Practice Day 3

## End-of-Unit Assessment

# Unit 5 Proving Congruence

Students use rigid transformations and logical reasoning to prove congruent relationships in angles and quadrilaterals.

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## **Pre-Unit Check** (Optional)

### **Sub-Unit 1** Using Transformations to Prove Congruence

- 5.01** Is It? Or Is It Not? | Definitions and Their Consequences
- 5.02** Always True? | Making Arguments About Angle Relationships
- 5.03** Angles and Transversals | Using Transformations to Prove Angle Relationships
- 5.04** Doing a 180 | Triangle Angle Sum
- 5.05** Proving Points | Proving the Properties of Points on Perpendicular Bisectors

## **Practice Day 1**

## **Sub-Unit Quiz**

### **Sub-Unit 2** Proving Theorems about Quadrilaterals

- 5.06** The Quad Squad (Optional) | Defining Quadrilaterals
- 5.07** Go With the Flow | Proofs of Parallelogram Properties
- 5.08** A-Door-Able Parallelograms | Diagonals of Parallelograms

## **Practice Day 2**

## **End-of-Unit Assessment**

# Unit 6 Similarity

Students build on their middle school understanding of dilations to prove when two figures are similar. Students investigate whether two figures are similar and use similarity to determine side lengths and angle measurements. They use the coordinate plane to explore and extend their understanding of symmetry and transformations.

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## Pre-Unit Check (Optional)

### Sub-Unit 1 Dilations

- 6.01 Shadowy Figures, Part 1 | Dilations and Their Scale Factors
- 6.02 Dilation Situations | Properties of Dilations
- 6.03 Lines of Thinking | Dilations of Lines and Their Angles
- 6.04 Triangle Truths, Part 1 | Dividing Triangle Sides Proportionally
- 6.05 Shadowy Figures, Part 2 | Modeling With Dilations

## Practice Day 1

## Sub-Unit Quiz

### Sub-Unit 2 Similar Figures

- 6.06 Beyond a Shadow of a Doubt | Connecting Similarity and Transformations
- 6.07 Revisiting Corresponding Components | Reasoning About Similarity
- 6.08 More Than Pairs | Always Similar Shapes
- 6.09 Similarity Conditions | Criteria for Triangle Similarity
- 6.10 Triangle Truths, Part 2 | Parallel Lines and Triangles
- 6.11 Similarity Search (Optional) | Investigations of Similar Triangles

## Practice Day 2

## Sub-Unit Quiz

### Sub-Unit 3 Properties on the Plane

- 6.12 Mystery Figures | Exploring Symmetry on the Coordinate Plane
- 6.13 DesignTime | Transforming for Congruence and Similarity
- 6.14 Restaurant Ratios | Partitioning Segments
- 6.15 The Point of the Proof | Centroid of a Triangle on a Coordinate Plane
- 6.16 Closet Coordination | Representative Points With Coordinate Geometry

## Practice Day 3

## End-of-Unit Assessment

# Unit 7 Right Triangles

Students explore relationships between the sides and angles of right triangles to build an understanding of ratios, leading to the naming of sine, cosine, and tangent as trigonometric ratios. They use similarity to estimate angles and sides using trigonometric ratios before they use the calculator to support reasoning quantitatively.

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## **Pre-Unit Check** (Optional)

### **Sub-Unit 1** Similarity in Right Triangles

- 7.01** Splitting Right | Similarity in Right Triangles
- 7.02** The Proof Is in the Puzzling | Proving the Pythagorean Theorem
- 7.03** Half-Time (Optional) | Exploring Relationships in Special Right Triangles
- 7.04** Cheesy Challenges (Optional) | Applications of Special Right Triangles

### **Sub-Unit 2** Trigonometric Ratios

- 7.05** Thwack Attack | Exploring Right Triangle Relationships
- 7.06** Triangle Zapper | Using Right Triangle Relationships
- 7.07** Careful Calculations | Solving for Lengths of Triangle Sides
- 7.08** Take It as a Complement | Sine and Cosine of Complementary Angles in Right Triangles
- 7.09** Angle Inspector | Solving for Unknown Angles
- 7.10** Something is Non-Right (Optional) | Trigonometry in Non-Right Triangles

## **Practice Day 1**

## **End-of-Unit Assessment**

# Unit 8 Circles

Students deepen their understanding of circles through exploring angle relationships, proportions of a circle (arcs and sectors), and inscribing and circumscribing with circles. They explore how to describe circles and parabolas on the coordinate plane.

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## Pre-Unit Check (Optional)

### Sub-Unit 1 Lines, Angles, and Circles

- 8.01 Beetle Races | Distances Around Circles and Arcs
- 8.02 On Your Arcs . . . Get Plants . . . Grow! | Arc Length of Circles
- 8.03 Irrigating Areas | Area of Sectors
- 8.04 Reasoning With Ratios | Measures of Central Angles
- 8.05 Meaningful Measures | Introduction to Radians
- 8.06 Radians, Partitions, and Pi, Oh My! | Comparing Radian and Degree Measures
- 8.07 Embrace the Trace | Inscribed Angles
- 8.08 On a Tangent | Tangent Lines and Angle Relationships

## Practice Day 1

## Sub-Unit Quiz

### Sub-Unit 2 Circles and Polygons

- 8.09 Quadrilateral Round-Up | Quadrilaterals Inside Circles
- 8.10 Early Bird Gets the Worm | Triangles Circumscribed by Circles
- 8.11 The Tradition of Inscription | Circles Inscribed in Triangles
- 8.12 Circle Collab | Strategizing With Circles

### Sub-Unit 3 Circles on a Plane

- 8.13 Clawdine the Crab | Equations of Circles
- 8.14 Squarely Circle | Connecting Perfect Squares and Circle Equations
- 8.15 Round in Circles | Completing the Square to Explore Circles
- 8.16 Planting Patterns | Points on Parabolas
- 8.17 Curve Your Enthusiasm | Defining Parabola Equations Geometrically

## Practice Day 2

## End-of-Unit Assessment

# Unit 9 Solid Geometry

Students make sense of relationships between two-dimensional figures and three-dimensional solids by creating nets. They justify which formulas can be used to calculate volumes of prisms, cylinders, pyramids, and cones.

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## **Pre-Unit Check** (Optional)

### **Sub-Unit 1** Relationships Between 2-D and 3-D Figures

- 9.01** Hey Now, You're a Block Star | Nets of Three-Dimensional Solids
- 9.02** All About That Base | Volumes of Prisms and Cylinders
- 9.03** At a Slant | Exploring the Volume of Oblique Cylinders and Prisms
- 9.04** Sweet Spot | Volumes of Composed Solids

## **Practice Day 1**

## **Sub-Unit Quiz**

### **Sub-Unit 2** Pyramids, Cones, and Modeling

- 9.05** Return of the Cross Sections | Comparing the Volumes of Pyramids
- 9.06** Formula Foundations | Building a Volume Formula for Pyramids and Cones
- 9.07** I Can't Believe It's Cake | Solving Problems Using Volume
- 9.08** Barn Bites (Optional) | Scaling Solids

## **Practice Day 2**

## **End-of-Unit Assessment**