Scope and Sequence for Integrated Math 2

Students begin the course making observations about triangles. Building from these observations, students gather experimental information, develop conjectures, write informal justifications, and then progress to writing formal proofs using definitions, assertions, and theorems developed in Math 1.

Using transformation-based definitions of congruence and similarity allows students to rigorously prove triangle similarity theorems. Students apply theorems to prove results about quadrilaterals and other figures. Students extend their understanding of similarity to right triangle trigonometry in this course and to periodic functions in future courses.

Students then begin their study of quadratic functions. Students investigate real-world contexts, look closely at the structural attributes of a quadratic function, and analyze how these attributes are expressed in different representations. The unit concludes with a study of the geometry of parabolas.

Next, students engage with quadratic equations. Through reasoning, writing equivalent equations, and applying the quadratic formula, students extend their ability to use equations to model relationships and solve problems. Along the way students encounter rational and irrational solutions, deepening their understanding of the real-number system. This work leads to students developing an understanding of complex numbers and solving quadratic equations that include non-real solutions. The idea of i, a number whose square is -1, expands the number system to include complex numbers.

Nearing the end of the course, students analyze relationships between segments and angles in circles and develop the concept of radian measure for angles, which will be built upon in subsequent courses. Students close the year by extending what they learned about probability in grade 7 to consider probabilities of combined events and to identify when events are independent.

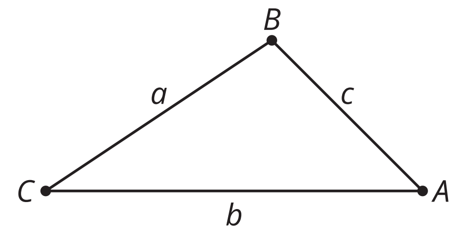
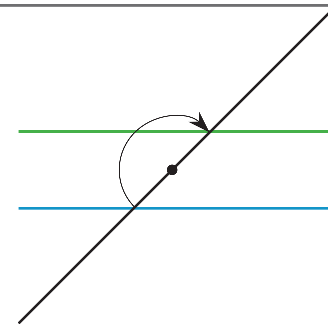
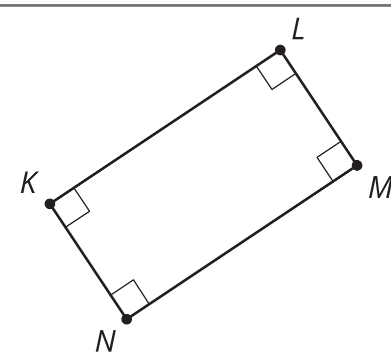
Within the classroom activities, students have opportunities to engage in aspects of mathematical modeling. Additionally, modeling prompts are provided for use throughout the course, offering opportunities for students to engage in the full modeling cycle. Implement these in a variety of ways. Please see the Mathematics Modeling Prompts section of this Course Guide for a more detailed explanation.

Geometry Reference Chart

In order to write convincing arguments, students need to support their statements with facts. The reference chart is a way to keep track of those facts for future reference when students are trying to prove new facts. At the beginning of the course, students are provided a chart with useful definitions, assertions, and theorems from previous courses in this sequence. Students continue adding entries and referring to them in the geometry sections of this course.

Print charts double sided to save paper. There should be a system for students to keep track of their charts (for example, hole punch and keep in a binder, or staple and tuck in the front of a notebook or the back of the workbook).

Each entry includes a statement, a diagram, a type and the date. A statement can be one of these three types: assertion, definition, or theorem. An assertion is an observation that seems to be true but is not proven. Sometimes assertions are not proven, because they are axioms or because the proof is beyond the scope of this course. The chart includes the most essential definitions. If there are additional definitions from this or previous courses that students would benefit from, feel free to add them. For example, it is assumed that students recall the definition of “isosceles.” If this is not the case, that would be a useful definition to record. Here are some entries to show the chart’s structure:

date, type	statement	diagram
[date] theorem	**Triangle Inequality Theorem:** If a triangle has side lengths a, b, and c, then $c < a + b$.	
[date] assertion	Rotation by 180 degrees takes lines to parallel lines or to themselves.	
[date] definition	A **rectangle** is a quadrilateral with four right angles.	

Students are not expected to record all of their observations in the chart. Sometimes students' conjectures will be proven in a subsequent lesson and added later as theorems rather than assertions. Other times students prove something that they will not need to use again. Students are welcome to use any proven statement in a later proof, but the reference chart is designed to be as concise as possible so it is a more useful reference than students' entire notebooks.

The intention is for students to be able to use their reference charts at any time, including during assessments. The goal is to learn to apply statements precisely, not to memorize. Some teachers ask students to make a tally mark each time they use a statement in the chart to justify a response. This allows students to see which are the most powerful statements and teachers to see how students are using their charts. Including the date will help students to know if they missed a row when they were absent or to locate a statement if they remember approximately how long ago they added it.

In addition to the blank reference chart, there is also a scaffolded version of the reference chart. The scaffolded version is intended to provide access for students with disabilities (language based, low vision, motor challenges) and English learners. In this version, students are provided with sentence frames for the "statement" column. The diagrams are also partially provided so students can focus on annotating key information. There is a teacher version of the chart in which the words needed to fill in the blanks and the missing annotations are highlighted.

Notation

Within student-facing text, these materials use words rather than symbols to allow students to focus on content instead of translating the meanings of symbols while reading. To increase exposure to different notation, images with information that is given by tick marks or arrows include a caption with the symbolic notation (like $\overline{AB} \cong \overline{CD}$). Teachers are encouraged to use the symbolic notation when recording student responses, since that is an appropriate use of shorthand.

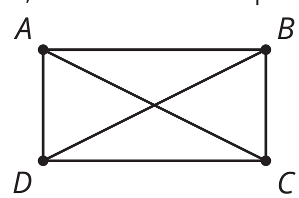
Unit 1: Convincing Arguments

During this unit, students will engage in each phase of the proof-writing cycle as they study and review properties of triangles and quadrilaterals. Writing proofs doesn't mean only providing the reasons for someone else's claim. Constructing a viable argument includes generating conjectures, detailing specific statements to be proved, writing a proof, and critiquing a proof. Students write proofs, starting with informal justifications and ending with formal proofs using definitions, assertions, and theorems developed in Math 1.

This unit begins by asking students to make observations about triangles. Students use experimental information to develop conjectures about triangles and justify those conjectures informally, preparing students for proof writing.

In the next section, students write rigorous proofs. Students use many of the properties of angles and triangles reviewed in the first section and the rigid transformations reviewed in this section. Though students may use imprecise language to convey their ideas at first, throughout the unit they will read examples, practice explaining ideas to a partner, and build a reference of precise statements to use in formal proofs.

In a previous course, students used transformations to prove the triangle congruence theorems, which are reviewed in this section. Building on their work with triangles, students learn and prove properties of quadrilaterals.



Note on materials: For many activities in this unit, students have access to a geometry toolkit that includes many tools that students can choose from strategically: compass and straightedge, tracing paper, colored pencils, and scissors. In some lessons, students will also need access to a ruler and protractor. When students work with quadrilaterals, instructions for making 1-inch strips cut from cardstock with evenly spaced holes are included. These strips allow students to explore dynamic relationships among sides and diagonals of quadrilaterals. Finally, there are some activities that are best done using dynamic geometry software, and these lessons indicate that digital materials are preferred. Students have the opportunity to choose appropriate tools (MP5) in nearly every lesson as they select among these options. For this reason, this math practice is highlighted only in lessons where it's particularly noteworthy.

Starting in the first section, a blank reference chart and reference material from a previous course are provided for students, and a completed reference chart is provided for teachers. The reference chart is a resource for students to refer to as they make formal arguments. To model clear communication with mathematical language, point students toward particular entries by describing their content instead of by number. For example, say "definition of 'congruent'" instead of "definition 2." Students will continue adding to the reference chart throughout the course. Refer to the Course Guide for more information.

These materials use words rather than symbolic notation to allow students to focus on the content. By using words, students do not need to translate the meaning of a symbol while reading. To increase exposure to different notations, images with given information marked using ticks, right angle marks, or arrows also have a caption with the symbolic notation. Feel free to use the symbolic notation when recording student responses, as that is an appropriate use of shorthand.

This unit intentionally allows extra time for students to learn new routines and establish norms for the year.

Section A: Triangles and Proof

- Lesson 1: What's Up, Triangle?
- Lesson 2: A Triangle's Sides
- Lesson 3: There's an Inequality Describing Any Triangle's Sides
- Lesson 4: Big Angles, Long Sides. Small Angles, Short Sides.
- Lesson 5: Unknown Angles
- Lesson 6: Quilt Questions

Section B: Evidence and Proof

- Lesson 7: Evidence, Angles, and Proof
- Lesson 8: Transformations
- Lesson 9: Transformations, Transversals, and Proof
- Lesson 10: One Hundred Eighty

Section C: Proofs about Quadrilaterals

- Lesson 11: Are Those Triangles Congruent?
- Lesson 12: Proofs about Quadrilaterals
- Lesson 13: Proofs about Parallelograms

Section D: Let's Put It to Work

- Lesson 14: Congruence for Quadrilaterals

Unit 2: Similarity

In this unit, students explore similar figures as pairs of figures for which one can be taken onto the other through a sequence of rigid transformations and a dilation. The work of this unit expands upon students' understanding of similarity, previously encountered in grade 8, and their work in an earlier unit on congruence.

The unit begins with an exploration of dilation properties, including the idea that angles are preserved through dilation and lines are taken to themselves or parallel lines depending on the center of dilation. Then students practice using a dilation along with rigid transformations to show that a pair of figures are similar and look for other ways to know that a pair of figures will be similar. The unit then focuses more closely on similar triangles, introducing theorems such as the Angle-Angle Similarity Theorem and connections to the Pythagorean Theorem.

Students focus on writing conjectures and proving them throughout the unit. Students should become more familiar with the process of noticing a pattern, making a conjecture, then looking to find counterexamples or justifying the conjecture with a proof.

Note on materials: For most activities in this unit, students have access to a geometry toolkit that includes tools that students can choose from strategically: compass and straightedge, tracing paper, colored pencils, and scissors. In some lessons, students will also need access to a ruler and a protractor. Students are given access to measuring tools in certain activities, to ensure that their focus during most activities is on logic and reasoning. Using a straightedge without markings on it forces students to attend to attributes of diagrams other than the specific length. In the final section, "Let's Put It to Work," there are optional activities involving going outside to indirectly measure the heights of tall objects. Students will need measuring tools and may also choose to use speciality materials such as straws or small mirrors. Finally, there are some activities that are best done using dynamic geometry software, and these lessons encourage teachers to prepare to give students access to the digital version of the student materials. Students will continue to use and add to their reference charts. The completed reference chart for this unit is provided for teacher reference.

Section A: Properties of Dilations

- Lesson 1: Scale Drawings
- Lesson 2: Scale of the Solar System
- Lesson 3: Measuring Dilations
- Lesson 4: Dilating Lines and Angles
- Lesson 5: Splitting Triangle Sides with Dilation (Part 1)

Section B: Similarity Transformations and Proportional Reasoning

- Lesson 6: Connecting Similarity and Transformations
- Lesson 7: Reasoning about Similarity with Transformations
- Lesson 8: Are They All Similar?
- Lesson 9: Conditions for Triangle Similarity
- Lesson 10: Other Conditions for Triangle Similarity
- Lesson 11: Splitting Triangle Sides with Dilation (Part 2)
- Lesson 12: Weighted Averages
- Lesson 13: Weighted Averages in a Triangle

Section C: Similarity in Right Triangles

- Lesson 14: Practice with Proportional Relationships
- Lesson 15: Using the Pythagorean Theorem and Similarity
- Lesson 16: Proving the Pythagorean Theorem
- Lesson 17: Finding All the Unknown Values in Triangles

Section D: Let's Put It to Work

- Lesson 18: Reflection Similarity

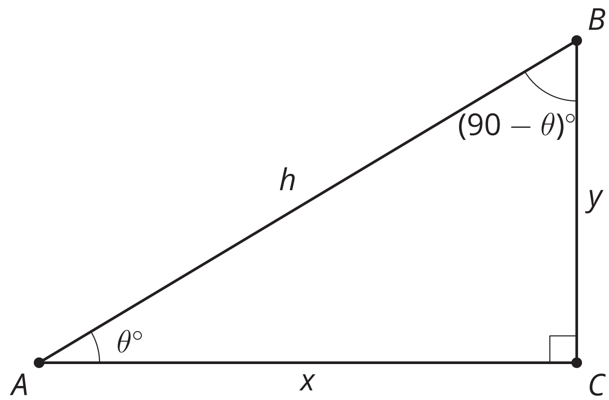
Unit 3: Right Triangle Trigonometry

In this unit students build an understanding of ratios in right triangles, which leads to naming cosine, sine, and tangent as trigonometric ratios.

Prior to beginning this unit, students will have considerable familiarity with right triangles and similarity. They learned to identify right triangles in grade 4. Students studied the Pythagorean Theorem in grade 8, and used similar right triangles to build the idea of slope. This unit builds on this extensive experience and grounds trigonometric ratios in familiar contexts.

Several concepts build throughout the unit. Students begin by using similar triangles to create a table of ratios of the side lengths in right triangles. At first, their table includes only the bottom rows of the table shown here. Taking the time to both build and use the table helps students construct a solid foundation before they learn the names of trigonometric ratios.

	cosine	sine	tangent
angle	adjacent leg ÷ hypotenuse	opposite leg ÷ hypotenuse	opposite leg ÷ adjacent leg
25°	0.906	0.423	0.466
65°	0.423	0.906	2.145



Students notice patterns between the columns for cosine and sine before they first hear the terms “cosine” and “sine.” In a subsequent lesson they investigate that relationship, proving the two ratios are equal for complementary angles. Finding the measures of acute angles in a right triangle follows a similar arc, where students first use the table to estimate and then in a subsequent lesson learn how to calculate an angle measure given the side measures by using arcsine, arccosine, and arctangent.

As students measure side lengths and compute ratios, there is an opportunity to discuss precision. In this unit, students will round side lengths to the nearest tenth and angle measures to the nearest degree in most cases. When students solve problems in context they grapple with whether or not their answer is reasonable, as well as the appropriate degree of precision to report.

Students will continue to use and add to their reference charts. The completed reference chart for this unit is provided for teacher reference.

Section A: Angles and Steepness

- Lesson 1: Angles and Steepness
- Lesson 2: Half a Square
- Lesson 3: Half an Equilateral Triangle
- Lesson 4: Ratios in Right Triangles
- Lesson 5: Working with Ratios in Right Triangles

Section B: Defining Trigonometric Ratios

- Lesson 6: Working with Trigonometric Ratios
- Lesson 7: Applying Ratios in Right Triangles
- Lesson 8: Sine and Cosine in the Same Right Triangle
- Lesson 9: Trigonometry Squared
- Lesson 10: Using Trigonometric Ratios to Find Angles

Section C: Let's Put It to Work

- Lesson 11: Solving Problems with Trigonometry
- Lesson 12: Approximating Pi

Unit 4: Introduction to Quadratic Functions

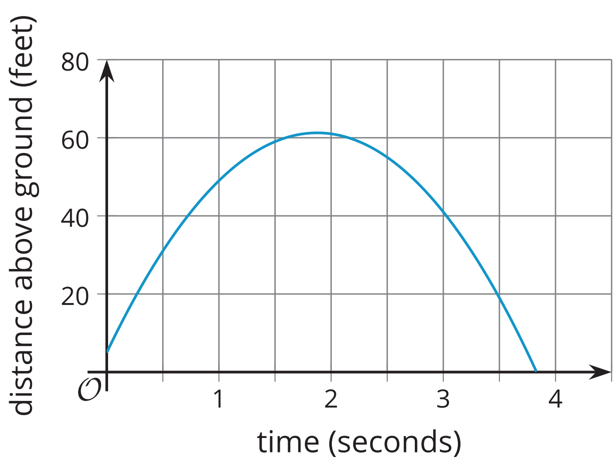
Prior to this unit, students have studied what it means for a relationship to be a function, used function notation, and investigated linear and exponential functions. In this unit, they look at some patterns that grow quadratically and contrast this growth with linear and exponential growth. They further observe that eventually these quadratic patterns grow more quickly than do linear patterns but more slowly than exponential patterns grow.

Students examine the important example of free-falling objects whose height over time can be modeled with quadratic functions. They use tables, graphs, and equations to describe the movement of these objects, eventually looking at the situation in which a projectile is launched upward. They interpret the meaning of each term in this context and work toward understanding how the coefficients influence the shape of the graph. Additional situations, such as revenue and area, are also introduced.

Next, students examine standard, factored, and vertex forms of quadratic functions. They recognize what information about the graph is easily obtained from each form and how the different values in each form influence the graph. In particular, they begin to generalize ideas of how horizontal and vertical translation, as well as vertical and horizontal stretching of graphs, relate to modifying the equation of a function.

Then students use the idea that a parabola can be defined as all the points equally distant from a point called the "focus" and a line called the "directrix." Students use the Pythagorean Theorem to write functions that describe parabolas with a given focus and directrix, then recognize that the functions must be quadratic.

Note on materials: Access to graphing technology is necessary for many activities. Examples of graphing technology are: a handheld graphing calculator, a computer with a graphing calculator application installed, and an internet-enabled device with access to a site like desmos.com/calculator or geogebra.org/graphing. For students using the digital version of these materials, a separate graphing calculator tool isn't necessary. Interactive applets are embedded throughout, and a graphing calculator tool is accessible in the student math tools.



Section A: A Different Kind of Change

- Lesson 1: A Different Kind of Change
- Lesson 2: How Does It Change?

Section B: Quadratic Functions

- Lesson 3: Building Quadratic Functions from Geometric Patterns
- Lesson 4: Comparing Quadratic and Exponential Functions
- Lesson 5: Building Quadratic Functions to Describe Situations (Part 1)
- Lesson 6: Building Quadratic Functions to Describe Situations (Part 2)
- Lesson 7: Building Quadratic Functions to Describe Situations (Part 3)

Section C: Working with Quadratic Expressions

- Lesson 8: Equivalent Quadratic Expressions
- Lesson 9: Standard Form and Factored Form
- Lesson 10: Graphs of Functions in Standard and Factored Forms

Section D: Quadratic Graphs

- Lesson 11: Graphing from the Factored Form
- Lesson 12: Graphing the Standard Form (Part 1)
- Lesson 13: Graphing the Standard Form (Part 2)
- Lesson 14: Graphs That Represent Situations

Section E: Parts of a Parabolic Graph

- Lesson 15: Vertex Form
- Lesson 16: Graphing from the Vertex Form
- Lesson 17: Changing the Vertex
- Lesson 18: Distances and Parabolas
- Lesson 19: Equations and Graphs

Unit 5: Quadratic Equations

In this unit, students interpret, write, and solve equations algebraically.

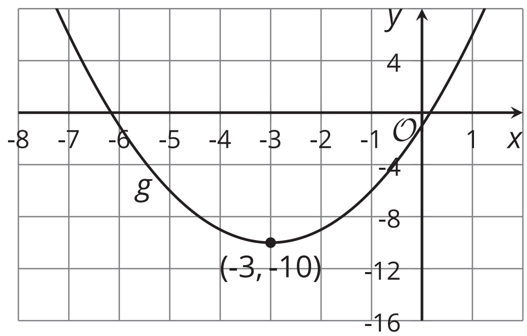
Previously, students represented quadratic functions using expressions, tables, and descriptions. They connected important features of graphs to standard, factored, and vertex forms and expanded expressions into standard form.

Students begin with solving quadratic equations through reasoning without much algebraic manipulation. Then, they examine solving using the zero product property for quadratic equations that can be written in factored form. They notice patterns that help them rewrite quadratic expressions in factored form and recognize that not all of them are easily factorable.

This motivates finding another process of solving quadratic equations. Students recognize the benefits of equations of the form $(x-n)^2 = q$ and develop the method of completing the square. Then, they generalize this process to the quadratic formula.

Throughout the unit, students analyze quadratic equations to recognize that there can be 0, 1, or 2 solutions. Solutions can be rational, irrational, or combinations of these. Students interpret the solutions that arise in different contexts.

The unit concludes with rewriting quadratic expressions from standard form into vertex form to find maximum and minimum values, then apply all of their understanding to applied problems.



Section A: Finding Unknown Inputs

- Lesson 1: Finding Unknown Inputs
- Lesson 2: When and Why Do We Write Quadratic Equations?

Section B: Solving Quadratic Equations

- Lesson 3: Solving Quadratic Equations by Reasoning
- Lesson 4: Solving Quadratic Equations with the Zero Product Property
- Lesson 5: How Many Solutions?
- Lesson 6: Rewriting Quadratic Expressions in Factored Form (Part 1)
- Lesson 7: Rewriting Quadratic Expressions in Factored Form (Part 2)
- Lesson 8: Rewriting Quadratic Expressions in Factored Form (Part 3)
- Lesson 9: Solving Quadratic Equations by Using Factored Form
- Lesson 10: Rewriting Quadratic Expressions in Factored Form (Part 4)

Section C: Completing the Square

- Lesson 11: What Are Perfect Squares?
- Lesson 12: Completing the Square (Part 1)
- Lesson 13: Completing the Square (Part 2)
- Lesson 14: Completing the Square (Part 3)
- Lesson 15: Quadratic Equations with Irrational Solutions

Section D: The Quadratic Formula

- Lesson 16: The Quadratic Formula
- Lesson 17: Applying the Quadratic Formula (Part 1)
- Lesson 18: Applying the Quadratic Formula (Part 2)
- Lesson 19: Deriving the Quadratic Formula
- Lesson 20: Rational and Irrational Solutions
- Lesson 21: Sums and Products of Rational and Irrational Numbers

Section E: Vertex Form Revisited

- Lesson 22: Rewriting Quadratic Expressions in Vertex Form

- Lesson 23: Using Quadratic Expressions in Vertex Form to Solve Problems

Section F: Let's Put It to Work

- Lesson 24: Using Quadratic Equations to Model Situations and Solve Problems

Unit 6: Complex Numbers

In this unit, students use what they know about exponents and radicals to extend exponent rules to include rational exponents, use square roots to develop an understanding of complex numbers, and solve quadratic equations that include complex roots.

The unit opens with an optional review of exponent rules before using those rules to justify why $x^{\frac{a}{b}} = \sqrt[b]{x^a}$ when a and b are integers and x is positive. The new rule leads to an exploration of square and cube roots as solutions to equations of the form $x^2 = c$ or $x^3 = c$. In particular, students learn that positive numbers have two square roots and that $\sqrt{c}$ represents only the positive root.

The next section introduces imaginary and complex numbers by proposing i as a solution to the equation $x^2 = -1$. Students explore the implications of this new type of number by representing it on an imaginary axis off of the real number line. This exploration includes adding imaginary and real numbers together to get complex numbers, and then adding and multiplying complex numbers.

Next, students revisit the methods of completing the square and using the quadratic formula to solve any quadratic equation, including those with complex solutions.

$$\begin{aligned} x^2 - 12x + 36 + 5 &= 0 \\ (x-6)^2 + 5 &= 0 \\ (x-6)^2 &= -5 \\ x - 6 &= \pm i\sqrt{5} \\ x &= 6 \pm i\sqrt{5} \end{aligned}$$

Section A: Exponent Properties

- Lesson 1: Properties of Exponents
- Lesson 2: Square Roots and Cube Roots
- Lesson 3: Exponents That Are Unit Fractions
- Lesson 4: Positive Rational Exponents
- Lesson 5: Negative Rational Exponents

Section B: A New Kind of Number

- Lesson 6: Squares and Square Roots
- Lesson 7: A New Kind of Number
- Lesson 8: Introducing the Number i
- Lesson 9: Arithmetic with Complex Numbers
- Lesson 10: Multiplying Complex Numbers
- Lesson 11: More Arithmetic with Complex Numbers
- Lesson 12: Working Backward

Section C: Solving Quadratics with Complex Numbers

- Lesson 13: Completing the Square and Complex Solutions
- Lesson 14: The Quadratic Formula and Complex Solutions
- Lesson 15: Real and Non-Real Solutions

Unit 7: Circles

In this unit, students investigate the geometry of circles more closely. In grade 7, students used formulas for the area and circumference of a circle to solve problems. In a previous course, students made formal geometric constructions. Earlier in this course, students studied similarity and proportional reasoning, and proved theorems about lines and angles. This unit builds on these skills and concepts. In later courses, the concepts learned in this unit will be helpful as students connect the unit circle to trigonometric functions.

First, students make connections between prior work with distance in the coordinate plane and the definition of a circle to create a generalized equation for a circle in the coordinate plane: $(x-h)^2+(y-k)^2=r^2$.

Then, students define the terms “chord,” “arc,” and “central angle” before observing that inscribed angles are half the measure of their associated central angles, and writing related proofs about congruent chords and similar triangles. Throughout this unit, students also construct lines tangent to circles and use their proofs that a tangent line is perpendicular to the radius drawn to the point of tangency.

Next, students prove properties of cyclic quadrilaterals, and they use their understanding of perpendicular bisectors from a previous unit to construct triangles with circumscribed circles and define “circumcenter.” Students then use angle bisectors to construct incenters of triangles and circles inscribed in triangles.

In the next section, students develop methods for calculating sector areas and arc lengths, and then students define “radian measure of a central angle” as the quotient of the length of the arc defined by the angle and the radius of the circle. They develop fluency with radian measures by shading portions of circles and working with a double number line.

In the final lesson, students apply what they have learned about circles to solve problems in context.

In this unit, students will do several constructions. A particular choice of construction tools is not necessary. Paper folding and straightedge and compass moves are both acceptable methods.

Students will continue to use and add to their reference charts. The completed reference chart for this unit is provided for teacher reference.

Section A: Distance and Circles

- Lesson 1: Connecting Distance and Circles
- Lesson 2: Equation of a Circle
- Lesson 3: Completing the Square
- Lesson 4: Intersection Points

Section B: Lines, Angles, and Circles

- Lesson 5: Lines, Angles, and Curves
- Lesson 6: Inscribed Angles
- Lesson 7: Tangent Lines

Section C: Polygons and Circles

- Lesson 8: Quadrilaterals in Circles
- Lesson 9: Triangles in Circles
- Lesson 10: A Special Point
- Lesson 11: Circles in Triangles

Section D: Measuring Circles

- Lesson 12: Arcs and Sectors
- Lesson 13: Part to Whole
- Lesson 14: Angles, Arcs, and Radii
- Lesson 15: A New Way to Measure Angles
- Lesson 16: Radian Sense
- Lesson 17: Using Radians

Section E: Let's Put It to Work

- Lesson 18: Putting It All Together

Unit 8: Conditional Probability

In this unit, students extend their understanding of probability, sample spaces, and events from their introduction in grade 7. The chance experiments under consideration have multiple parts, such as rolling a number cube and then flipping a coin—allowing events within the sample space to be considered in new ways.

The unit begins with students creating different models for understanding sample spaces and probability. The models include tables, trees, lists, and Venn diagrams. Venn diagrams allow students to visualize various subsets of the sample space, such as "A and B," "A or B," or "not A." Tables help students determine the probability of those subsets occurring, and support students' understanding of the Addition Rule, $P(\text{A or B}) = P(\text{A}) + P(\text{B}) - P(\text{A and B})$.

Conditional probability is discussed and applied using several games and connections to everyday situations. In particular, the Multiplication Rule $P(\text{A and B}) = P(\text{A} \mid \text{B}) \cdot P(\text{B})$ is used to determine conditional probabilities. Conditional probability leads to a study of independence of events. Students describe independence using everyday language and use the equations $P(\text{A} \mid \text{B}) = P(\text{A})$ and $P(\text{A and B}) = P(\text{A}) \cdot P(\text{B})$ when events A and B are independent.

The unit closes with students making conjectures about the independence of events, when playing games with one another, and then testing those conjectures by collecting data and analyzing the results.

Section A: Up to Chance

- Lesson 1: Up to Chance
- Lesson 2: Playing with Probability
- Lesson 3: Sample Spaces
- Lesson 4: Tables of Relative Frequencies
- Lesson 5: Combining Events
- Lesson 6: The Addition Rule

Section B: Related Events

- Lesson 7: Related Events
- Lesson 8: Conditional Probability
- Lesson 9: Using Tables for Conditional Probability
- Lesson 10: Using Probability to Determine Whether Events Are Independent

Section C: Let's Put It to Work

- Lesson 11: Probabilities in Games

Pacing Guide

Number of days includes assessments. Upper bound of range includes optional lessons. Does not include time for modeling prompts.

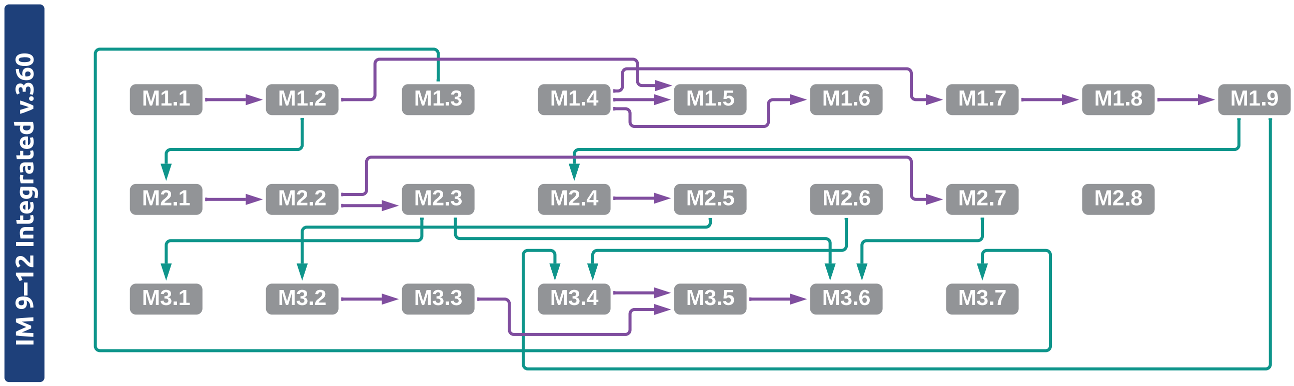
<table>
<tr><th></th><th>Math 1</th><th>Math 2</th><th>Math 3</th></tr>
<tr><td>week 1</td><td rowspan="4">Unit 1 (MA)
Constructions and Rigid Transformations
20–22 days
Optional Lessons: 8, 18</td><td rowspan="3">Unit 1
Convincing Arguments
16 days
Optional lessons: none</td><td rowspan="4">Unit 1
Solid Geometry
21–22 days
Optional Lessons: 10</td></tr>
<tr><td>week 2</td></tr>
<tr><td>week 3</td></tr>
<tr><td>week 4</td><td rowspan="4">Unit 2
Similarity
17–20 days
Optional Lessons: 2, 10, 14</td></tr>
<tr><td>week 5</td><td rowspan="3">Unit 2
Congruence
12–13 days
Optional Lesson: 11</td><td rowspan="4">Unit 2
Polynomial Functions
17 days
Optional Lessons: none</td></tr>
<tr><td>week 6</td></tr>
<tr><td>week 7</td></tr>
<tr><td>week 8</td><td rowspan="3">Unit 3
One-Variable Statistics
13–18 days
Optional Lessons: 2, 5, 6, 7, 8</td><td rowspan="3">Unit 3
Right Triangle Trigonometry
14 days
Optional Lessons: none</td></tr>
<tr><td>week 9</td><td rowspan="4">Unit 3
Rationals, Radicals, and Identities
16–18 days
Optional Lessons: 10, 16</td></tr>
<tr><td>week 10</td></tr>
<tr><td>week 11</td><td rowspan="4">Unit 4
Linear Equations and Systems
16–21 days
Optional Lessons: 2, 4, 5, 18, 19</td><td rowspan="5">Unit 4 (MA)
Introduction to Quadratic Functions
19–22 days
Optional Lesson: 13, 14, 16</td></tr>
<tr><td>week 12</td></tr>
<tr><td>week 13</td><td rowspan="5">Unit 4 (MA)
Exponential Functions and Equations
21–24 days
Optional Lessons: 2, 7, 23</td></tr>
<tr><td>week 14</td></tr>
<tr><td>week 15</td><td rowspan="3">Unit 5
Coordinate Geometry
12–13 days
Optional Lessons: 10</td></tr>
<tr><td>week 16</td><td rowspan="5">Unit 5 (MA)
Quadratic Equations
26–27 days
Optional Lessons: 18</td></tr>
<tr><td>week 17</td></tr>
<tr><td>week 18</td><td rowspan="3">Unit 6
Two-Variable Statistics
11–12 days
Optional Lesson: 10</td><td rowspan="4">Unit 5
Transformations of Functions
17 days
Optional Lessons: none</td></tr>
<tr><td>week 19</td></tr>
<tr><td>week 20</td></tr>
<tr><td>week 21</td><td rowspan="3">Unit 7
Linear Inequalities and Systems
11 days
Optional Lessons: none</td><td rowspan="4">Unit 6
Complex Numbers
13–17 days
Optional: 1, 2, 11, 15</td></tr>
<tr><td>week 22</td><td rowspan="5">Unit 6 (MA)
Trigonometric Functions
23 days
Optional Lessons: none</td></tr>
<tr><td>week 23</td></tr>
<tr><td>week 24</td><td rowspan="4">Unit 8 (MA)
Functions
23 days
Optional Lessons: none</td></tr>
<tr><td>week 25</td><td rowspan="4">Unit 7
Circles
20 days
Optional Lessons: none</td></tr>
<tr><td>week 26</td></tr>
<tr><td>week 27</td><td rowspan="4">Unit 7 (MA)
Statistical Inferences
17–18 days
Optional Lesson: 4</td></tr>
<tr><td>week 28</td><td rowspan="5">Unit 9 (MA)
Introduction to Exponential Functions
22–24 days
Optional Lesson: 13, 14</td></tr>
<tr><td>week 29</td><td rowspan="3">Unit 8
Conditional Probability
11–13 days
Optional Lessons: 1, 11</td></tr>
<tr><td>week 30</td></tr>
<tr><td>week 31</td><td></td></tr>
<tr><td>week 32</td><td></td><td></td></tr>
</table>

(MA) = Unit has Mid-Unit Assessment

Total number of days = Lessons + Assessments − Optional Lessons

Math 1 = 140, Math 2 = 136, Math 3 = 132

Dependency Chart



In the unit dependency chart, an arrow indicates that a particular unit is designed for students who already know the material in a previous unit. Reversing the order of the units would have a negative effect on mathematical or pedagogical coherence. For example, there is an arrow from M1.8 to M1.9 because when exponential functions are introduced, function notation is used, assuming that students are already familiar with the notation.

The following chart shows unit dependencies between 6–8 and Integrated Math.