# Algebra I

## Grade(s) 9

<table>
<thead>
<tr>
<th>Month/Marking Period</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
<th>January</th>
</tr>
</thead>
</table>

### Essential Question(s):
- What are the similarities and differences between algebraic and arithmetic functions?
- How are functions and relationships related?
- How is an equation analogous to a balance?
- How can you check the reasonableness of your solution?
- How do inequalities relate to equations?
- Why is slope a foundational topic?
- What is the significance of a solutions to a system of equations?

### Content:
- **Algebraic Language Functions and Graphs**
- **Simple Equations**
- **Solving Equations**
- **Solving Inequalities**
- **Graphing and Writing Linear Equations**
- **System of Equations and Inequalities**

### Skills and Topics:
- Use matrix operations
- Determine and use mathematical properties
- Evaluate and Solve simple algebraic equations
- Graph and utilize functions
- Link data, equations, and graphs to each other
- Express parts of a whole in equivalent terms (e.g., fractions, decimals, percent)
- Identify algebraic sequences
- Model and solve 1- and 2-step equations
- Apply the Distributive Property
- Use percents to represent parts of a whole
- Apply proportions to real-world problems
- Validate solutions to equations
- Write and solve multi-step equations with variables on both sides of the equals
- Validate solutions to equations
- Interpret and solve absolute value problem
- Solve inequalities
- Validate solutions to inequalities
- Write and solve multi-step equations and inequalities with variables on both sides of the equals or inequality symbols
- Identify and graph linear equations using slope-intercept form
- Compare and contrast different forms of equations based on their corresponding graph
- Express an equation in a variety of forms (e.g., standard form, slope-intercept)
- Graph equations using different methods
- Solve linear system of equations using multiple methods (graphing, substitution and elimination)
- Validate solutions and judge the reasonability of the solution

---

Adopted by the Somerville Board of Education on July 25, 2017
<table>
<thead>
<tr>
<th>Month/Marking Period</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
<th>January</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference:</td>
<td>Chapter 1 and 2</td>
<td>Chapter 3</td>
<td>Chapter 4</td>
<td>Chapter 5</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>Performance Assessments:</td>
<td>• “Is it Magic?”&lt;br&gt;• “Are Numbers Great and Small?”</td>
<td>• “Percentage Discounts”</td>
<td>• “Global Warming Earth Science Application”</td>
<td>• “Faster, Higher, Stronger”</td>
<td>• “Making Tracks”</td>
</tr>
<tr>
<td>Geometry Connection:</td>
<td>• Use common geometry formulas to review order of operations</td>
<td>• Use complimentary and supplementary angles to solve equations&lt;br&gt;• Investigate opposite (vertical) angles by solving equations&lt;br&gt;• Use percent of change as it relates to the change in radius of a circle&lt;br&gt;• Utilize proportions by addressing similar figures&lt;br&gt;• Rewriting formulas using common Geometry formulas (i.e. area of rectangle, volume of cylinder, etc.)&lt;br&gt;• Triangle inequalities theorem: the sum of lengths of any two sides must be greater than the third</td>
<td>• Finding slope by using the sides of polygons&lt;br&gt;• Determining if a set of given points are vertices of a right triangle&lt;br&gt;• Using slope to determine if a figure is a parallelogram</td>
<td>• Using methods of solving systems to find the sides of a rectangle represented by two equations</td>
<td></td>
</tr>
</tbody>
</table>

Integration of Technology: Internet, Web Quests, Chrome Books, SMART Boards, Google Apps (Document, Sheets, etc.), E-mail, Youtube, TI-SmartView, Grapher

Formative Assessments: Teacher observation, class participation, Do Now activities, opening activities, closing activities, authentic benchmark assessments

Summative Assessments: Quizzes, tests, projects, presentations, benchmark assessments
**March**
- Algebra I
- Grade(s) 9

<table>
<thead>
<tr>
<th>Month/Marking Period</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
</tr>
</thead>
</table>

**Essential Question(s):**
- How can we determine the shape and tendency of a function using standard form?
- What are the applications of exponential numbers?
- How do radical expressions expand mathematical possibilities?
- Why do different approaches yield valid solutions?
- How can predictions be based of data?

**Content:**
- Quadratic Functions
- Exponents and Exponential Functions
- Solving Radical Equations
- Polynomial and Rational Expressions
- Probability

**Skills and Topics:**
- Graph a quadratic equation using critical characteristics
- Solve quadratic functions using the quadratic formula, completing the square, finding zeros, and square roots
- Determine the number of solutions using the discriminate of a quadratic function
- Perform computations using numbers expressed in scientific notation
- Simplify using the properties of exponents
- Analyze exponential growth and decay
- Construct linear and exponential functions
- Apply the Pythagorean theorem
- Determine formulas and apply the distance and midpoint of a segment
- Simplify and re-write radical expressions
- Solve radical equations
- Assign appropriate nomenclature to a polynomial
- Add and subtract polynomial expressions
- Factor polynomials using different methods
- Solve polynomial functions using the Zero-Product Property · simplify rational expressions
- Find experimental and theoretical probability
- Finding probability of independent and dependent events
<table>
<thead>
<tr>
<th>Month/Marking Period</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference:</td>
<td>Chapter 7 and 10</td>
<td>Chapter 8</td>
<td>Chapter 9</td>
<td>Topics from Chapter 10 and Chapter 11</td>
<td>Collection of Probability Sections</td>
</tr>
<tr>
<td>Performance Assessments:</td>
<td><strong>Quadratics</strong></td>
<td><strong>Ponzi Scheme</strong></td>
<td><strong>As the Crow Flies</strong></td>
<td><strong>Polynomials: Alternative Assessment and Math Journals (McDougal Littell)</strong></td>
<td><strong>Magic Squares</strong></td>
</tr>
<tr>
<td>Geometry Connection:</td>
<td>Use square roots to solve formulas such as area of a circle or area of a sphere</td>
<td>Use properties of exponents and cubes to write the surface area of a cube given one side length</td>
<td>Topics in Chapter 9 relate to Geometry content</td>
<td>Write polynomials in standard form given a figure and formula involving polynomial expressions</td>
<td>Probability of randomly choosing a sub-line segment within a larger line segment Probability of a dart hitting a circular dart board with given radius</td>
</tr>
<tr>
<td>Integration of Technology</td>
<td>Internet, Web Quests, Chrome Books, SMART Boards, Google Apps (Document, Sheets, etc.), E-mail, Youtube, TI-SmartView, Grapher</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formative Assessments:</td>
<td>Teacher observation, class participation, Do Now activities, opening activities, closing activities, authentic benchmark assessments</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summative Assessments:</td>
<td>Quizzes, tests, projects, presentations, benchmark assessments</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>