

**Math I UNIT 3 OVERVIEW: Systems of Equation & Inequalities**

<p align="center"><b>Unit Outcomes</b></p> <p align="center">At the end of this unit, your student should be able to:</p>	<p align="center"><b>Key Vocabulary</b></p> <p align="center">Terms to deepen the student's understanding</p>
<ul style="list-style-type: none"> <li>✓ Use coordinates to prove simple geometric theorems algebraically (<i>e.g. prove that a quadrilateral created by connecting four points is a parallelogram using the slope criteria and/or distance on the coordinate plane</i>).</li> <li>✓ Prove the slope criteria for parallel and perpendicular lines.</li> <li>✓ Write the equation for a line that is parallel and/or perpendicular to a given line.</li> <li>✓ Use the slope criteria to solve geometric problems (<i>e.g., determine if two lines are parallel, perpendicular, or neither; find the equation of a line parallel or perpendicular to a given line that passes through a given point; find the coordinates of a fourth vertex of a quadrilateral given three vertices and its shape</i>).</li> <li>✓ Find the midpoint of a segment.</li> <li>✓ Write equations in standard form into slope intercept form.</li> <li>✓ Understand that when two lines intersect the point is common to both equations. (<i>It is the point where the two situations are the same</i>).</li> <li>✓ Solve a system of equations by graphing, substitution, and elimination (<i>combination</i>).</li> <li>✓ Apply understanding of solving systems of equations to application problems.</li> <li>✓ Graph and interpret linear inequalities.</li> <li>✓ Graph and solve systems of linear inequalities.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Infinitely many solutions</li> <li>✓ Intersecting lines</li> <li>✓ Midpoint</li> <li>✓ No Solution</li> <li>✓ Parallel lines</li> <li>✓ Perpendicular lines</li> <li>✓ Solution of a system of linear equations</li> <li>✓ Substitution</li> <li>✓ Substitution method</li> <li>✓ System of Linear Equations</li> </ul>
<p align="center"><b>Key Standards Addressed</b></p> <p align="center">Connections to Common Core/NC Essential Standards</p>	<p align="center"><b>Where This Unit Fits</b></p> <p align="center">Connections to prior and future learning</p>
<p><b>8.G.6</b> Explain a proof of the Pythagorean Theorem and its converse.</p> <p><b>8.G.7</b> Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.</p> <p><b>8.G.8</b> Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.</p> <p><b>8.EE.8</b> Analyze and solve pairs of simultaneous linear equations.</p> <p>a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.</p> <p>b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection.</p> <p>c. Solve real-world and mathematical problems leading to two linear equations in two variables.</p> <p><b>NC.M1.G-GPE.4</b> Use coordinates to solve geometric problems involving polygons algebraically:</p> <ul style="list-style-type: none"> <li>• Use coordinates to compute perimeters of polygons and areas of triangles and rectangles.</li> </ul>	<p><b>Coming into this unit, students should have a strong foundation in:</b></p> <ul style="list-style-type: none"> <li>✓ Solving one variable equations</li> <li>✓ Graphing linear functions</li> <li>✓ Solving one variable inequalities</li> <li>✓ Operations with integers</li> <li>✓ Identifying key features of a function from a graph</li> </ul> <p><b>This unit builds to the following future skills and concepts:</b></p> <ul style="list-style-type: none"> <li>✓ Graphing and analyzing more complex functions (<i>including inverse, step, exponential, absolute value, trigonometric and logarithmic functions</i>)</li> <li>✓ Evaluating piecewise functions</li> <li>✓ Transformations of geometric shapes.</li> </ul>

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<p><b>NC.M1.G-GPE.5</b> Use coordinates to prove the slope criteria for parallel and perpendicular lines and use them to solve problems.</p> <ul style="list-style-type: none"> <li>• Determine if two lines are parallel, perpendicular, or neither.</li> <li>• Find the equation of a line parallel or perpendicular to a given line that passes through a given point.</li> </ul> <p><b>NC.M1.G-GPE.6</b> Use coordinates to find the midpoint or endpoint of a line segment.</p> <p><b>NC.M1.A-CED.2</b> Create and graph equations in two variables to represent linear, exponential, and quadratic relationships between quantities.</p> <p><b>NC.M1.A-CED.3</b> Create systems of linear equations and inequalities to model situations in context.</p> <p><b>NC.M1.A-REI.5</b> Explain why replacing one equation in a system of linear equations by the sum of that equation and a multiple of the other produces a system with the same solution.</p> <p><b>NC.M1.A-REI.6</b> Use tables, graphs, or algebraic methods (substitution and elimination) to find approximate or exact solutions to systems of linear equations and interpret solutions in terms of a context.</p> <p><b>NC.M1.A-REI.10</b> Understand that the graph of a two variable equation represents the set of all solutions to the equation.</p> <p><b>NC.M1.A-REI.12</b> Represent the solutions of a linear inequality or a system of linear inequalities graphically as a region on of the plane.</p>	
<p style="text-align: center;"><b>Additional Resources</b> Materials to support understanding and enrichment</p>	<p style="text-align: center;"><b>“Learning Checks”</b> Questions Parents Can Use to Assess Understanding</p>
<ul style="list-style-type: none"> <li>✓ <a href="#">Teaching Videos made by Wake County teachers</a></li> <li>✓ <a href="#">WCPSS YouTube Channel – Math Playlist</a></li> <li>✓ <a href="#">Systems of equations overview (video)</a></li> <li>✓ <a href="#">Solving systems of equations (practice)</a></li> <li>✓ <a href="#">Systems of inequalities overview (video)</a></li> <li>✓ <a href="#">Solving systems of inequalities (practice)</a></li> <li>✓ <a href="#">Standard form overview (video)</a></li> <li>✓ <a href="#">Standard form (practice)</a></li> <li>✓ <a href="#">Graphing Systems Equations Inequalities</a></li> </ul>	<ul style="list-style-type: none"> <li>✓ What are the advantages and disadvantages of the different types of methods for solving systems of equations?</li> <li>✓ How are systems of linear equations and systems of inequalities alike? Different?</li> <li>✓ What type of real-life situations can be modeled using a system of equation and/or inequalities?</li> </ul>