

Math 1 UNIT 3 OVERVIEW: Systems of Equation & Inequalities

Unit Outcomes	Key Vocabulary	
At the end of this unit, your student should be able to:	Terms to deepen the student's understanding	
<ul style="list-style-type: none"> • 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>). • Prove the slope criteria for parallel and perpendicular lines. • Write the equation for a line that is parallel and/or perpendicular to a given line. • 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>). • Find the midpoint of a segment. • 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>). • Solve a system of equations by graphing, substitution, and elimination (<i>combination</i>). • Apply understanding of solving systems of equations to application problems. • Graph and interpret linear inequalities. • Graph and solve systems of linear inequalities. 	<ul style="list-style-type: none"> • Coordinates • Distance Formula • Elimination • Greater Than • Hypotenuse • Inequality • Infinitely many solutions • Intersecting Lines • Intersection • Legs • Less than • Midpoint • No solution • Ordered Pairs 	<ul style="list-style-type: none"> • Parallel Lines • Perpendicular Lines • Pythagorean Theorem • Pythagorean Triple • Quadrilaterals • Right Angle • Right Triangle • Slope • Solution • Substitution • Substitution Method • System of Equations • System of Inequalities
Key Standards Addressed	Where This Unit Fits	
Connections to Common Core/NC Essential Standards	Connections to prior and future learning	
<p>8.G.6 Explain a proof of the Pythagorean Theorem and its converse.</p> <p>8.G.7 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>8.G.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.</p> <p>8.EE.8 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>Coming into this unit, students should have a strong foundation in:</p> <ul style="list-style-type: none"> • Solving one variable equations • Graphing linear functions • Solving one variable inequalities • Operations with integers • Identifying key features of a function from a graph <p>This unit builds to the following future skills and concepts:</p> <ul style="list-style-type: none"> • Graphing and analyzing more complex functions (<i>including inverse, step, exponential, absolute value, trigonometric and logarithmic functions</i>) • Evaluating piecewise functions • Transformations of geometric shapes. 	

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

NC.M1.G-GPE.4 Use coordinates to solve geometric problems involving polygons algebraically:

- Use coordinates to compute perimeters of polygons and areas of triangles and rectangles.
- Use coordinates to verify algebraically that a given set of points produces a particular type of triangle or quadrilateral.

NC.M1.G-GPE.5 Use coordinates to prove the slope criteria for parallel and perpendicular lines and use them to solve problems.

- 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.

NC.M1.G-GPE.6 Use coordinates to find the midpoint or endpoint of a line segment.

NC.M1.A-CED.2 Create and graph equations in two variables to represent linear, exponential, and quadratic relationships between quantities.

NC.M1.A-CED.3 Create systems of linear equations and inequalities to model situations in context.

NC.M1.A-REI.5 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.

NC.M1.A-REI.6 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.

NC.M1.A-REI.10 Understand that the graph of a two variable equation represents the set of all solutions to the equation.

NC.M1.A-REI.12 Represent the solutions of a linear inequality or a system of linear inequalities graphically as a region on of the plane.

Math I UNIT 3 OVERVIEW: Systems of Equation & Inequalities

<p>Additional Resources Materials to support understanding and enrichment</p>	<p>“Learning Checks” Questions Parents Can Use to Assess Understanding</p>
<ul style="list-style-type: none"> • Teaching Videos made by Wake County teachers • Systems of equations overview (video) • Solving systems of equations (practice) • Systems of inequalities overview (video) • Solving systems of inequalities (practice) • Standard form overview (video) 	<ul style="list-style-type: none"> • How is the Pythagorean Theorem useful in finding distances? • How can I use slope to determine if a line is parallel, perpendicular or neither? • What are the advantages and disadvantages of the different types of methods for solving systems of equations? • How are systems of linear equations and systems of inequalities alike? Different? • What type of real-life situations can be modeled using a system of equation and/or inequalities?

* **Please note**, the unit guides are a work in progress. If you have feedback or suggestions on improvement, please feel free to contact wakemiddle@wcpss.net.