Unit H - *Advanced Coordinate Geometry*

Overview

In this final unit, students link what they have learned in Algebra I about graphing equations to the concepts they have learned throughout this Geometry course. The work in this unit will create a smooth bridge to the work done in Algebra II.

21st Century Capacities: Synthesizing, Analyzing

Stage 1 - Desired Results

ESTABLISHED GOALS/ STANDARDS	*Transfer:*
MP 1 Make sense of problems and persevere in solving them **MP2** Reason abstractly and quantitatively **MP7** Look for and make use of structure CCSS.MATH.CONTENT.HSA.CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	*Students will be able to independently use their learning in new situations to...* 1. Draw conclusions about graphs, shapes, equations, or objects. (Analyzing) 2. Make sense of a problem, initiate a plan, execute it, and evaluate the reasonableness of the solution. (Analyzing) 3. Apply familiar mathematical concepts to a new problem or apply a new concept to rework a familiar problem. (Synthesizing)

	Meaning:	
CCSS.MATH.CONTENT.HSA.CED.A.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. CCSS.MATH.CONTENT.HSA.REI.C.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system	UNDERSTANDINGS: *Students will understand that:* 1. Effective problem solvers work to make sense of the problem before trying to solve it. 2. Mathematicians identify relevant tools, strategies, relationships, and/or information in order to draw conclusions.	ESSENTIAL QUESTIONS: *Students will explore & address these recurring questions:* A. What does the solution tell me? B. What is the most efficient way to solve this problem?

with the same solutions.	Acquisition:	
CCSS.MATH.CONTENT.HSA.REI.C.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. CCSS.MATH.CONTENT.HSA.REI.C.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$. CCSS.MATH.CONTENT.HSA.REI.D.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). CCSS.MATH.CONTENT.HSA.REI.D.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes. CCSS.MATH.CONTENT.HSG.GPE.B.4 Use coordinates to prove simple geometric theorems algebraically. CCSS.MATH.CONTENT.HSG.GPE.B.5 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).	*Students will know…* 1. Slope intercept, point slope and general linear form of lines and how to fluently use the form to get information about the line 2. A system of equations has either one, no or an infinite number of solutions 3. That the graph of a system of inequalities represents the points that are a solution to all the inequalities in the system 4. Vocabulary: system	*Students will be skilled at…* 1. Verifying if a point is a solution to an equation 2. Graphing an equation, inequality or a system of equations or inequalities 3. Using geometric properties learned throughout the course to solve problems on the coordinate plane including those involving slope, distance, area 4. Writing equations of lines from given information 5. Solving a system of equations by substitution, addition algorithm, graphing 6. Identifying the center and radius of a circle given in standard form and graph it 7. Writing the equation of the graph of a circle