Algebra 1 Standard Unit 4: Systems of Equations

Unit #:	APSDO-00017731	Duration:	3.0 Week(s)	Date(s)	

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Grade(s)
8, 9
Subject(s)
Mathematics

Unit Focus

In this unit, students will solve linear systems of equations graphically, find points of intersection, solve linear systems of equations algebraically, and write and solve a system of linear equations in a real-world context. Students will understand which method of solving a linear system of equations is most appropriate and apply an appropriate model. . Primary instructional materials for this unit include Algebra I, Glencoe/McGraw Hill, 2014.

Stage 1: Desired Results - Key Understandings

Standard(s)

Common Core
Mathematics: 8

- 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.
  CCSS.MATH.CONTENT.8.EE.C.8A
- Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, 3x + 2y = 5 and 3x + 2y = 6

Transfer

T1 (T50) Based on an understanding of any problem, initiate a plan, execute it and evaluate the reasonableness of the solution.
T2 (T53) Articulate how mathematical concepts relate to one another in the context of a problem or in the theoretical sense.
T3 (T51) Examine alternate methods to accurately and efficiently solve problems.
T4 (T52) Use appropriate tools strategically to deepen understanding of mathematical concepts.
T5 (T23) Use functions or equations to model relationships among quantities.

Meaning

Understanding(s)	Essential Question(s)
U1 (U204) Substituting a correct value(s) for an unknown makes the mathematical	**Q1** (Q201) How can I represent this information in symbols/equations/models?

have no solution because 3x + 2y cannot simultaneously be 5 and 6. *CCSS.MATH.CONTENT.8.EE.C.8B*

- Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair. *CCSS.MATH.CONTENT.8.EE.C.8C*

Mathematics: 9-12

- Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.* *CCSS.MATH.CONTENT.HSA.REI.D.11*
- 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.HSA.REI.D.12*
- 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.CED.A.3*
- Prove that, given a system of two equations in two variables, replacing one

statement/relationship true.
U2 (U206) A function can represent how quantities in the real world relate to one another.
U3 (U202) The application of specific properties and order of operations can simplify expressions, solve equations, and combine functions.
U4 (U502) Effective problem solvers identify and apply an appropriate model, tool, or strategy.
U5 (U541) The accuracy of a solution depends upon the proper selection and effective use of a mathematical tool.

Q2 (Q202) What value(s) can I use/substitute to make this relationship true?
Q3 (Q503) What strategies/approaches are best for this problem?
Q4 (Q540) What tool(s) is appropriate for use with this model?
Q5 (Q541) How do I use tools to solve problems?

Acquisition of Knowledge and Skill

Knowledge	Skill(s)
	S1 solve linear systems of equations graphically **S2** find points of intersection using a graphical device (graphically) **S3** solve linear systems of equations algebraically (substitution and elimination/combination) **S4** write and solve a system of linear equation in a real-world context **S5** estimate solutions by inspection of the equations

equation by the sum of that equation and a multiple of the other produces a system with the same solutions. *CCSS.MATH.CONTENT.HSA.REI.C.5* • 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.6* • Make sense of problems and persevere in solving them. *CCSS.MATH.MP.1* • Use appropriate tools strategically. *CCSS.MATH.MP.5*		**S6** understand which method of solving linear system of equations is most appropriate **S7** understand when a system of equations is an appropriate model