

Solving Systems of Equations By Graphing

Date: _____

Subject: Pre-Algebra, Algebra I, or Algebra II
Grade: 7, 8, or 10

Topic: Systems of Equations
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Stage 1 – Desired Results

Lesson Overview: This activity takes real world applications of systems of equations and has students look at graphs and use them to analyze the meaning of a given situation. The activity is intended for pre-algebra or algebra I students who are learning about systems of equations for the first time, or algebra II students who are reviewing systems of equations or need extra help with the subject. By the end of the activity, students will be able to graph a system of equations on the same x-y axes and identify the solution to a system of linear equations. Students will also gain a generalized understanding of how to analyze given situations involving systems of equations in a real life setting.

Standards Addressed:

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.

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.

Enduring Understanding:

A system of equations is a set of two or more equations in two or more variables. A linear system of equations is a set of two or more linear equations. A linear system of two equations can be classified in one of three ways: consistent independent, consistent dependent, and inconsistent. A consistent dependent system consists of two lines that intersect in a single location. This location is the solution to the system. A consistent dependent system consists of two equations that represent the same line, therefore they intersect in infinitely many locations and there are infinitely many solutions that satisfy both equations. An inconsistent system is a system with no solutions as the two lines are parallel and will never intersect.

Essential Questions:

What does the solution of a system of equations represent?

How can we relate systems of equations to a real world situation?

How can a graph of a system of equations reveal the solution to the system?

<p>Students will need to know: At this point, students are expected to understand how to graph a line given in slope-intercept form, how to graph a line using x- and y-intercepts, how to re-arrange a linear equation so it is in slope-intercept form, and how to solve equations containing a single variable.</p>	<p>Students will be able to:</p> <ul style="list-style-type: none"> • Graph two linear equations on the same x-y axes. • Identify the solution of a system of equations after graphing. • Classify a system of equations based on the graph of the system.
<p>Stage 2 – Assessment Evidence</p>	
<p>Performance Tasks: In this activity:</p> <ul style="list-style-type: none"> • Asking students to graph two lines on the same x-y axes. • Asking students to identify the solution to a system of equations from a graph. • Asking students to classify a system of equations from a graph. 	<p>Other Evidence:</p> <ul style="list-style-type: none"> • To be decided by the teacher.
<p>Stage 3 – Learning Plan</p>	
<p>Lesson Procedure:</p> <p><u>Many Days Before:</u> Students have previously completed a unit on graphing lines. This activity can be used as an introduction to systems of equations.</p> <p><u>Day Of:</u> Students will go to the computer lab in order to complete this activity. For the duration of the activity, the teacher will monitor student progress to ensure that students complete the activity properly and do not simply click to complete. The activity will not take all class period, so the remainder of the class period will be at the discretion of the classroom teacher.</p>	<p>Required Materials:</p> <ul style="list-style-type: none"> • Computers for each student. • Pencil and paper for calculations if necessary.

Possible Discussion Questions for Students:

- Why do you believe that intersecting lines and coinciding lines are both classified as consistent while parallel lines are classified as inconsistent?
- What do you believe may be an example of a real life situation that would use systems of equations?

Sample Answers to Discussion Questions:

- Consistent may refer to the fact that the system actually contains at least one solution, while an inconsistent system has no solutions.
- Answers will vary here as this will be a difficult question for students to answer immediately. Students may gravitate towards monetary problems such as looking at where profit and cost lines intersect.