Systems of Inequalities

Author: Steven Turner
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LESSON OVERVIEW

Subject(s)	Mathematics
Topic or Unit of Study	Systems of Inequalities (Algebra II Honors)
Grade/Level	Grade 10
Objective	Students will be able to solve a system consisting of inequalities, absolute value fuctions, and/or linear equations by graphing.
Summary	

IMPLEMENTATION

Learning Context	Students have learned how to solve linear system consisting of a pair of linear equations in two variables by graphing as well as the substitution and elimination methods. Students also know how to graph absolute value functions. Students will learn later how to solve a system of linear inequalities with linear programming and solving a system with three variables in the subsequent lessons.
Teaching Strategies	Direct instruction, Thumbs up/Thumbs down
Time Allotment	1 class periods. 50 Mins. per class.
Sample Student Products	
Author's Comments & Reflections	This lesson does not teach linear programming or how to solve with three variables.

PROCEDURE

Anticipatory Set	<u>Interesting Fact of the Day</u> The world's largest wedding cake weighed 15,032 lbs. The amount of ingredients in this cake alone could probably bake each one of you their own cake. http://blu.stb.s-

Introduction

Today we are going to think about variables in terms of size. How tall is that cake? How big can we make h, height? We are going to look at word problems and see how we can find their limits!

Modeling

Teacher will use the textbook's "Inequality Systems Activity" on the computer to model how to graph systems of inequalities.

Graphing

$$\begin{cases} -x + y \leq 3 \\ x + y \leq -2 \end{cases}$$

$$\begin{cases} y < x + 3 \\ y < -x - 2 \end{cases}$$

Intermediate

A delivery woman for a bakery delivers pastries and cakes to customers. A batch of pastries sells for $10 and a cake sells for $30 (not including tips). On average she spends $20 on gas on her delivery route. However, her truck can only transport up to 24 boxed cakes. One cake box has the same volume as four boxes of pastries.

$$\begin{cases} 10P + 30C \geq 20 \\ \frac{1}{4}P + 1C \leq 24 \end{cases}$$

Advanced

Mr. Turner is baking for his brother's birthday party and each member of his family likes a different type of frosting on yellow cake. With his increible patience, Mr. Turner will try to bake as many cakes as possible in the four hours before the party. A yellow cake recipe requires 4 cups of all-purpose flour and 3 cups white surgar for each cake and takes 15 minutes to prepare and frost the cake and another 45 minutes to bake in the oven. Each cup of flour costs 10 cents, each cup of sugar costs 20 cents, and enough frosting for a cake costs $2. Mr. Turner does not want to spend more

than $30. How many cakes can he bake?

$$10 * 4 = \$0.40$$
$$20 * 3 = \$0.60$$
Total cost of $\$1$ per cake.

$$\begin{cases} 45C + 15F \leq 240 \\ 1C \;\; + 2F \;\; \leq 30 \end{cases}$$

Guided Practice	*Teacher will use the textbook's "Inequality Systems Activity" on the computer to present students with problems to practice on while the teacher goes around and help struggling students.*
	Lightning Round (Thumbs up/Thumbs down)
	The teacher will create different systems of inequalities using the tool provided by the textbook and a point for the students to check whether it is wihtin the shaded region of the system (the solution). After some small changes to the inequalities and/or the point chosen, the teacher will ask the students to give a thumbs up or a thumbs down to show whether the point is in the solution.
	Textbook page 138, problems 4-6
Independent Practice	Students will complete textbook pages 138-139 , problems 8-20 (even only), 30-34, 42
Closure	Wrap-Up
	Teacher will briefly review the steps taken to solve a system by graphing.
Follow-Up	*A warm-up will be given the next day. The problem will be the following:*

Warm-Up

MATERIALS AND RESOURCES

Instructional Materials

Resources

- Materials and resources:
  Algebra II textbook, teacher's computer with Internet access and hooked up to the projector
- Technology resources:
  Firefox, IE Explorer
- The number of computers required is 1.

STANDARDS & ASSESSMENT

Standards

Display: ○ Collapse All ● Expand All

▽ **CA- California Common Core State Standards (2012)**

　▽ **Subject:** Mathematics

　　▽ **Grade:** High School

　　　▽ **Content Area:** Algebra

　　　　▽ **Domain:**
　　　　Creating Equations A-CED

　　　　　▽ **Area:** Create equations that describe numbers or relationships

　　　　　　Standard:
　　　　　　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. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*

　　　　▽ *Domain:*
　　　　Reasoning with Equations and Inequalities A-REI

　　　　　▽ *Area: Represent and solve equations and inequalities graphically*

　　　　　　Standard:
　　　　　　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.

Assessment Plan

Homework is out of 20 points. The teacher will check 5 questions and grade *each* question (worth 4 points). The 5 questions will be from different sections of the assignment to avoid grading 5 questions that are the same problem-type (example: 5 problems asking to plot a linear equation) which may not adequately represent

the student's progress towards the lesson's learning goal/standard.

Assessment/Rubrics

Rubrics:

1. Textbook Homework Rubric