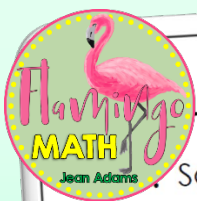


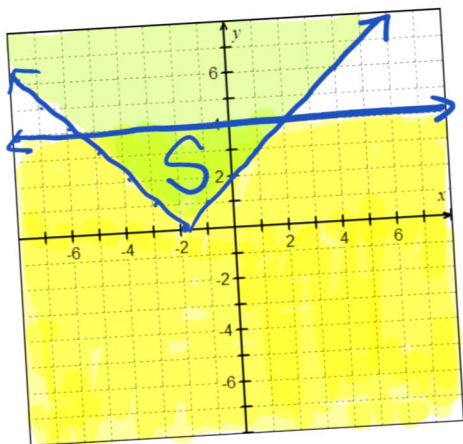
Algebra 2 Honors

Systems of Inequalities

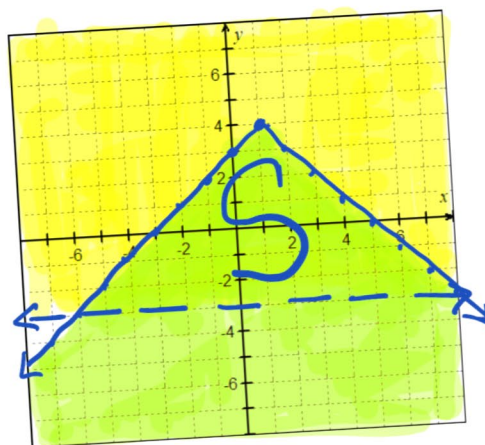


Solving a Linear/Absolute Value System

Solve. $\begin{cases} y \leq 4 \\ y \geq |x + 2| \end{cases}$



EX #6: Solve. $\begin{cases} y > -3 \\ y \leq -|x - 1| + 4 \end{cases}$



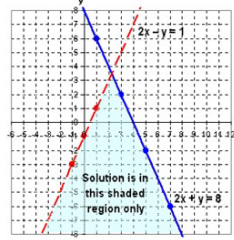
Completely Editable

3.3

Lesson 3: Systems of Inequalities

In this lesson, we will look at two or more linear inequalities for which a common solution is sought, called a system of inequalities. For example, consider the system whose solution is shown at right.

$$\begin{cases} 2x + y \leq 8 \\ 2x - y > 1 \end{cases}$$



Solving a System by Graphing

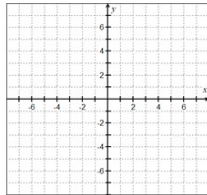
PROCEDURE:

Step 1: Solve each inequality for slope-intercept form.

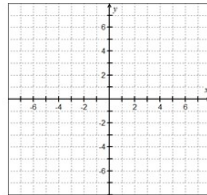
Step 2: Graph each inequality on a coordinate plane, shading in the appropriate half-plane.

Step 3: The solution to the system of inequalities is the region of overlapping areas.

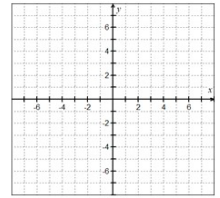
EX #1: Solve the system. $\begin{cases} x + 2y < 8 \\ 3x + 2y \geq 4 \end{cases}$



EX #2: Solve the system. $\begin{cases} x + 2y \leq 4 \\ y \geq -x - 1 \end{cases}$



EX #3: Solve the system: $\begin{cases} y - 2x \leq -3 \\ y \geq x - 2 \end{cases}$



Using a System of Inequalities

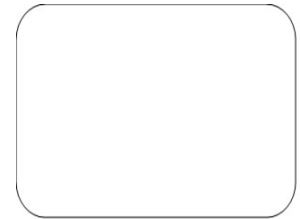
EX #4: Tickets to a concert cost \$70, or \$20 with a student discount. Ticket sales must exceed \$500,000 for the group to perform. If 20,000 seats are available, how many of each type must be sold? *Show the solution on your calculator.*

DEFINE:

Let x = the number of \$70 seats sold

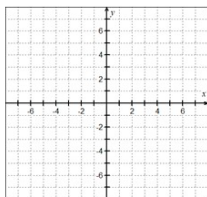
Let y = the number of \$20 seats sold

WRITE THE SYSTEM:

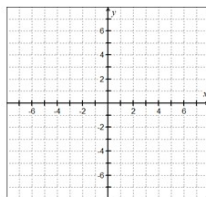


Solving a Linear/Absolute Value System

EX #5: Solve. $\begin{cases} y \leq 4 \\ y \geq |x + 2| \end{cases}$



EX #6: Solve. $\begin{cases} y > -3 \\ y \leq -|x - 1| + 4 \end{cases}$



Real-World Applications

EX #7: College Applications:

A college entrance exam has two sections, a verbal section and a mathematics section. You can score a maximum of 1600 points. For admission, the school of your choice requires a math score of at least 650. Write a system of inequalities to model scores that meet the school's requirements. Then solve the system by graphing.

y ↑

EX #8: A pizza parlor charges \$1 for each vegetable topping and \$2 for each meat topping. You want at least five toppings on your pizza. You have \$10 to spend on toppings. How many of each type of topping can you get on your pizza?

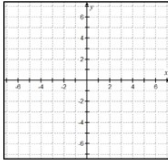


NOTES

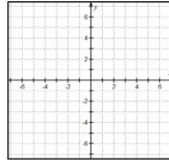
Solving Systems of Inequalities Practice

Problems 1–12, solve each system of inequalities by graphing.

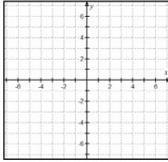
1.
$$\begin{cases} y \geq x - 4 \\ y < 1 - 2x \end{cases}$$



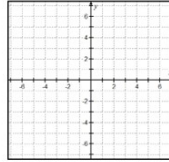
2.
$$\begin{cases} x + 2y < 8 \\ y < 3x - 4 \end{cases}$$



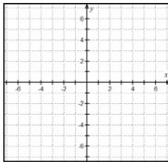
3.
$$\begin{cases} 3x - 2y < -6 \\ x \geq -4 \end{cases}$$



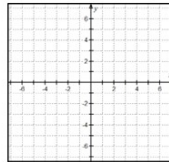
4.
$$\begin{cases} y > -3x + 2 \\ y \leq 2x - 3 \end{cases}$$



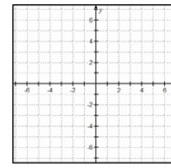
7.
$$\begin{cases} 8x - 4y \geq 0 \\ y + 3x < 2 \end{cases}$$



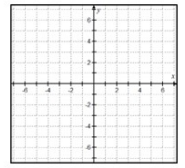
8.
$$\begin{cases} y \geq 2 \\ y \geq |x + 3| \end{cases}$$



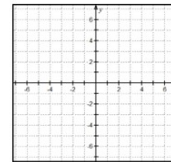
9.
$$\begin{cases} y - 2x < 1 \\ y \geq |x| - 3 \end{cases}$$



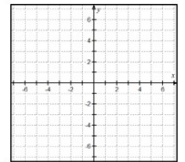
10.
$$\begin{cases} |x| < 3 \\ 4x + 2y \leq 2 \end{cases}$$



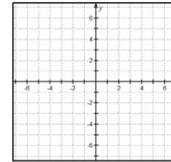
11.
$$\begin{cases} 2x + 4y \geq 8 \\ 2x - y < 3 \end{cases}$$



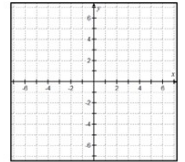
12.
$$\begin{cases} |y| \geq 4 \\ y > 3x + 1 \end{cases}$$



13.
$$\begin{cases} x + 3y \leq 6 \\ |x| \leq 3 \end{cases}$$



14.
$$\begin{cases} y > x - 3 \\ y \leq 5 - |x| \end{cases}$$

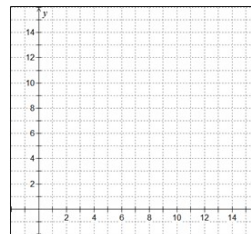


Problems 15–18, for each scenario, write a system of inequalities and use a graphing calculator to solve.

15. You need to bake some banana bread and some zucchini bread for a fund raiser at school. You plan to bake at least 4 and at most 12 loaves of bread. You need at least twice as many loaves of banana bread as zucchini bread.

A. Write a system of inequalities to model the scenario.

B. Graph the system.

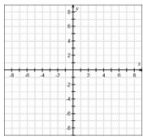
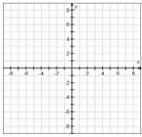
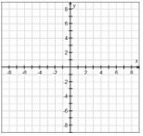


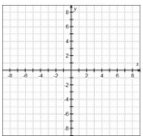
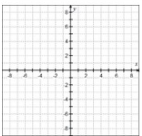
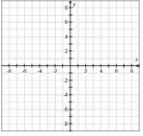
16. Cristina works as a math tutor for \$8 per hour and babysits her brother for \$6 per hour. She is only allowed to work 15 hours each week. She wants to earn at least \$75 each week. Write a system of inequalities to model the situation.

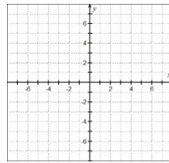
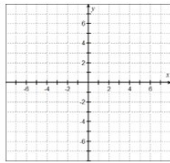
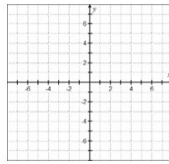
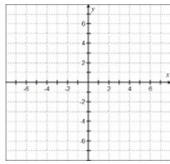
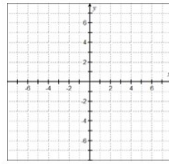
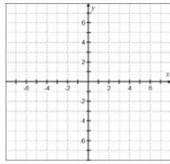
17. Kaden is packing books into boxes for the media center. Each box can hold either 16 small books or 9 large books. He needs to pack at least 36 boxes and at least 420 books. Write a system of linear inequalities to represent the situation.

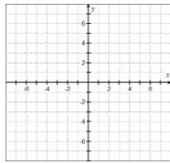
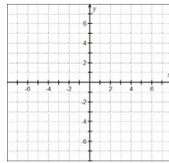
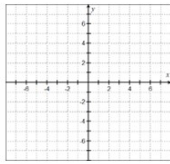
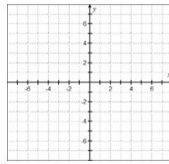
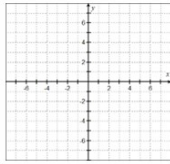
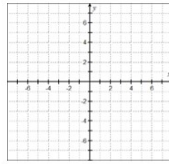
Practice Sets

Lesson Warm-Ups

Name _____ Date _____ Period _____	
Lesson 3.3: Solving Systems of Inequalities Warm-Up # 1	
1. Solve by graphing. $\begin{cases} y \geq x - 3 \\ y < -\frac{1}{3}x + 2 \end{cases}$ 	2. Solve by graphing. $\begin{cases} y > 2 \\ y < x + 4 \end{cases}$ 
3. Solve by graphing. $\begin{cases} y > x - 1 \\ y \leq 3 - x \end{cases}$ 	4. Karen is buying plants for her garden. She can only fit at most 20 plants in her garden. If tomato plants are \$4 each and corn is \$3 each. She only wants to spend a max of \$80. Write a system of inequalities to model the situation.

Name _____ Date _____ Period _____	
Lesson 3.3: Solving Systems of Inequalities Warm-Up # 2	
1. Solve by graphing. $\begin{cases} y \geq \frac{3}{4}x - 2 \\ y < -x \end{cases}$ 	2. Solve by graphing. $\begin{cases} x + 2y = 4 \\ x \leq 4 \end{cases}$ 
3. Solve by graphing. $\begin{cases} y < x \\ y \geq x - 4 \end{cases}$ 	4. An ice cream shop charges \$1 for candy toppings and \$2 for nut toppings. You have \$8 to spend on toppings and you want at least 3 toppings. Write a system of inequalities to model this situation.

3.3 Systems of Inequalities Form A	
Name _____ Date _____ Period _____	
1. $\begin{cases} y < -x + 4 \\ y < \frac{2}{3}x + 1 \end{cases}$ 	
2. $\begin{cases} -2y \leq x + 2 \\ y < x + 2 \end{cases}$ 	
3. $\begin{cases} y > -3 \\ y \leq - x + 2 + 1 \end{cases}$ 	
Grade: _____	

3.3 Systems of Inequalities Form B	
Name _____ Date _____ Period _____	
1. $\begin{cases} y > -x - 1 \\ y < \frac{1}{2}x + 2 \end{cases}$ 	
2. $\begin{cases} 3y > x + 6 \\ y \leq x + 4 \end{cases}$ 	
3. $\begin{cases} y < 4 \\ y \geq x - 2 \end{cases}$ 	
Grade: _____	

Daily Lesson Quiz