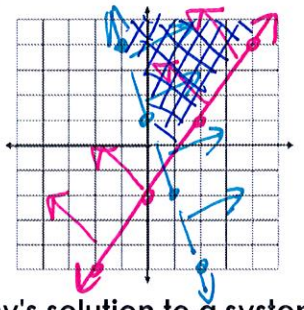
Algebra 1
Solving Systems of Inequalities in Context

Name Icey
Date

Graph the system and name three points that would be considered solutions.



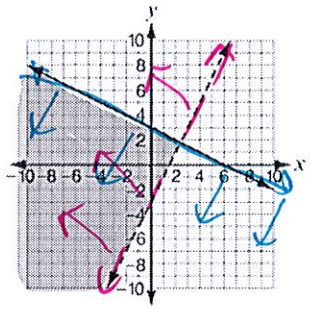
$y > -3x + 1$ dotted shade ↑
$3x - 2y \leq 4$

$3x - 2y \leq 4$
$-3x \quad -3x$
$\frac{-2y}{-2} \leq \frac{-3x+4}{-2}$
$y \geq \frac{3}{2}x - 2$
solid shade ↑

3 possible answers (1,3) (2,1) (0,4)

Definitely NOT answers (0,1) (-4,-5) (0,0)

Tiffany's solution to a system of inequalities is shown below.
Can you write the two inequalities that she would have graphed to come up with this answer?



y $> 2x - 3$

y $\leq -\frac{1}{2}x + 3$

Examples of Systems of Linear Inequalities in Context

Frosty wants to purchase Christmas gifts for all his new friends. He has found an online deal to buy ornaments (x) for $8 each and stockings (y) for $10 each. He only has $100 to spend. Write an inequality to represent the number of items he could purchase.

$8x + 10y \leq 100$

$8x + 10y \leq 100$
$-8x \quad -8x$
$10y \leq -8x + 100$

$y \leq \frac{-4}{5}x + 10$

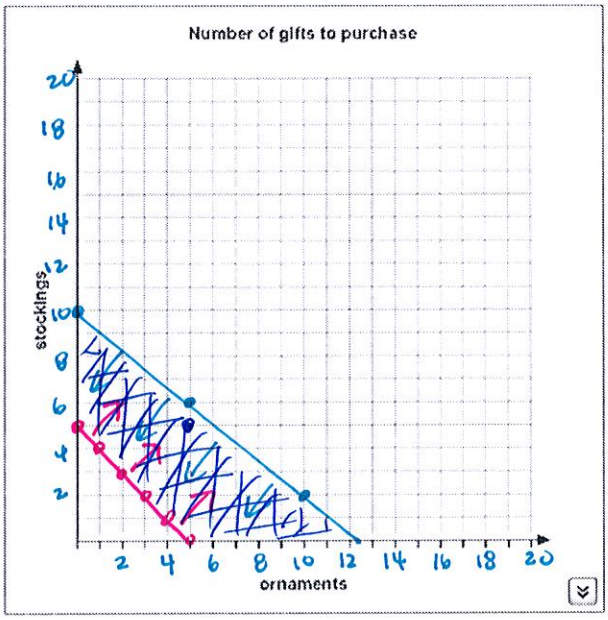
While he would like to purchase gifts for ALL his new friends, there are 6 kids that are his favorites for which he feels he MUST give gifts. Write an inequality for how many of each item he MUST buy. $x + y \geq 6$

$x + y \geq 6$
$-x \quad -x$
$y \geq -x + 6$

Write this system of inequalities in graphing form:

y $\leq -\frac{4}{5}x + 10$

y $\geq -x + 6$



Why should this system ONLY be graphed in the first quadrant? Graph it.
You cannot have negative ornaments or stockings

Would it be possible for Frosty to purchase 5 of each item? Justify your answer.
Yes! It is in the shaded region!

Suppose you have two jobs, babysitting, which pays $5 per hour, and bagging groceries, which pays $6 per hour. You can work no more than 20 hours each week, but you need to earn at least $90 per week. How many hours can you work at each job?

Let x = the number of hours babysitting
Let y = the number of hours bagging groceries
Write a system of inequalities to represent the situation.

$5x+6y \geq 90$

$x+y \leq 20$

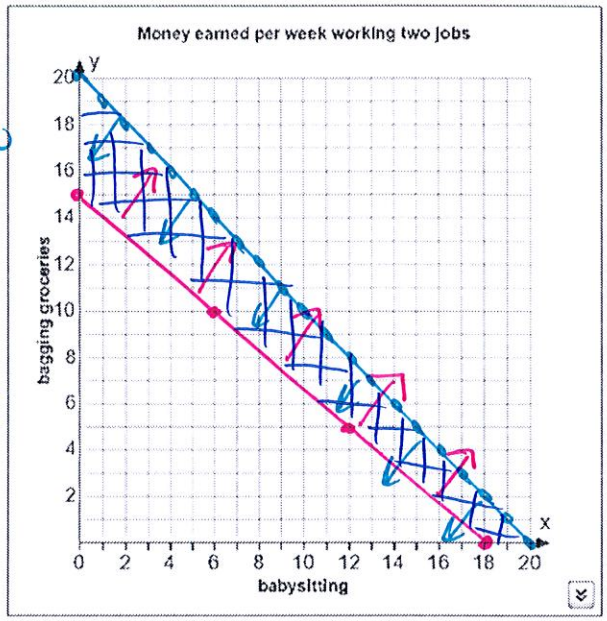
$5x+6y \geq 90$
$-5x \quad -5x$
$\frac{6y}{6} \geq \frac{-5x+90}{6}$
$y \geq -\frac{5}{6}x+15$

Place each inequality in graphing form and graph.

y $\geq -\frac{5}{6}x+15$

$x+y \leq 20$
$-x \quad -x$
$y \leq -x+20$

y $\leq -x+20$



How many hours can you work at each job?
(Give at least two possible solutions and explain.)

Ordered pair: (4,14)
Explanation: 4 hours babysitting, 14 hours bagging groceries

Ordered pair: (16,3)
Explanation: 16 hours babysitting, 3 hours bagging groceries

Jason is buying wings and hot dogs for a party. One package of wings costs $7. Hot dogs cost $4 per pound. He must spend less than $40. Write an inequality to represent the cost of Jason's food for the party.
Let x=# of packages of wings and y=# of pounds of hot dogs

$7x+4y < 40$

$7x+4y < 40$
$-7x \quad -7x$
$\frac{4y}{4} < \frac{-7x+40}{4}$
$y < -\frac{7}{4}x+10$

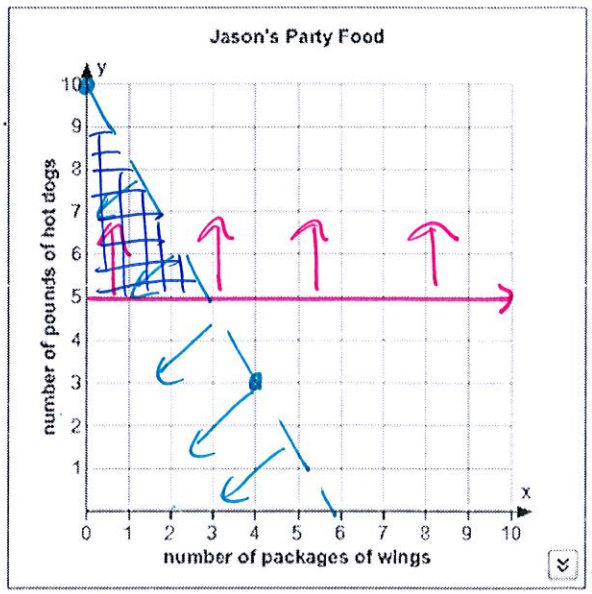
Jason knows that he will be buying at least 5 pounds of hot dogs. Write an inequality to represent this situation.

$y \geq 5$

Graph the system and give two possible solutions for Jason.

y $< -\frac{7}{4}x+10$

y ≥ 5



Solutions:

Ordered pair: (0,7)
Explanation: No wings, 7 lbs of hot dogs

Ordered pair: (2,6)
Explanation: 2 packages of wings, 6 lbs of hot dogs