key

CCGPS Coordinate Algebra

Representing Constraints WS – from Walch materials

Name _____

1. **Is the coordinate (1, -3) a solution to the inequality $y \leq -4x + 6$?**

$-3 \leq -4(1) + 6$

$-3 \leq 2$ ✓ True

plug 1 in for x and -3 in for y, if it makes the inequality true, it's a solution, if false not a solution. YES!

2. **You pay $12 to get into the fair, plus $3 per ticket for *x* ride tickets. You have $24 to spend at the fair.**

a. Write an inequality to represent this situation.

$12 + 3x \leq 24$

b. Solve your inequality. What is the maximum number of tickets you can buy with your $24?

$12 + 3x \leq 24$

$-12 \quad -12$

$\frac{3x}{3} \leq \frac{12}{3}$

$x \leq 4$ max 4

c. What is the minimum amount of money you will spend?

$12

d. What additional constraint do you need to put on the number of tickets?

$x \geq 0$

3. **Charlie borrowed $500 from his aunt. He has already paid back $75. His aunt doesn't charge interest and he is planning on making $15 payments each week.**

a. Write an inequality that represents how many weeks it will take for Charlie to pay back all $500.

$15w + 75 \geq 500$

b. Solve your inequality. What is the minimum number of weeks it would take?

$15w + 75 \geq 500$

$-75 \quad -75$

$\frac{15w}{15} \geq \frac{425}{15}$

$w \geq 28\frac{1}{3}$ 29 weeks

c. What additional constraint do you need to put on the number of weeks?

$w \geq 0$

4. **Your dad needs to rent a chainsaw to cut down trees in your yard. The rental company charges $20 plus $6.50 per hour to rent the chainsaw. Your dad wants to spend no more than $50.**

a. Write an inequality that represents how many hours your dad can rent the chainsaw.

$20 + 6.50h \leq 50$

b. Solve your inequality. What is the maximum number of hours?

$6.50h \leq 30$

$h \leq 4.615$ max 4 hours

c. What additional constraint do you need to put on the number of hours?

$h \geq 0$

5. **The concession stand at the basketball game sells cans of soda for $0.75 and bottles of water for $1.25. You have $10.00.**

a. Write an inequality that represents this situation if x = # of cans of soda and y = # of bottles of water.

$.75x + 1.25y \leq 10$

b. If you buy 8 cans of soda, how many bottles of water can you buy? How much money will be left?

$.75(8) + 1.25y \leq 10$

$6 + 1.25y \leq 10$

$1.25y \leq 4$

$y \leq 3.2$ 3 bottles

Total $9.75

change $.25

c. If you buy 5 bottles of water, how many cans of soda can you buy? How much money will be left?

$.75(x) + 1.25(5) \leq 10$

$.75x + 6.25 \leq 10$

$.75x \leq 3.75$

$x \leq 5$ 5 cans

Total $10

no change

Constraints in Decision Making - Larry's Labor Day Bash

Larry is planning a huge Labor Day party that he does every year for his friends and family. He has $100 set aside to spend on food for the party. He is trying to decide how many pounds of chicken to buy and how many steaks to buy. The chicken sells for $2 a pound, while the steaks sell for $5 per steak

1) Write an equation using 2 variables to represent Larry's purchasing decision. Define your variables.
c = pounds of chicken s = number of steaks

$2c + 5s \leq 100$

2) Use your equation to figure out how many steaks he can buy if he gets 20 pounds of chicken.

$2(20) + 5s \leq 100$
$40 + 5s \leq 100$
$5s \leq 60$
$s \leq 12$

12 or less steaks

3) How many pounds of chicken can he get if he buys 10 steaks?

$2c + 5(10) \leq 100$
$2c + 50 \leq 100$
$2c \leq 50$
$c \leq 25$

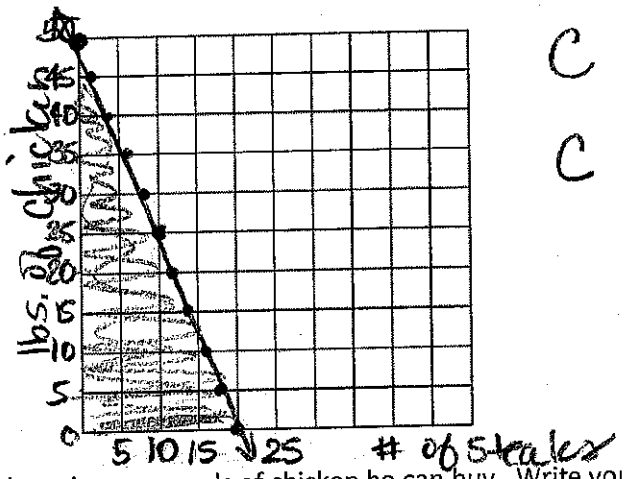
25 lbs or less

4) Solve your equation in terms of the pounds of chicken, c.

$2c + 5s \leq 100 - 5s$
$-5s \quad\quad -5s$

$\frac{2c}{2} \leq \frac{100}{2} - \frac{5s}{2}$

5) Graph the equation you just came up with in problem #4.



$c \leq 50 - \frac{5}{2}s$

$c \leq -\frac{5}{2}s + 50$

$m = -\frac{5}{2}$ $b = 50$

6) Find the minimum and maximum pounds of chicken he can buy. Write your answer as an inequality in terms of c, the pounds of chicken.

$c \geq 0$ or $c \leq 50$

7) Find the minimum and maximum number of steaks he can buy. Write your answer as an inequality in terms of s, the number of steaks.

$s \geq 0$ or $s \leq 20$

8) Identify the points representing your answers to problems 2 and 3 on your graph.

#2 (12, 20) #3 (10, 25)
s c s c