Name: _____ Date: _____

Identifying Constraints and Interpreting Solutions

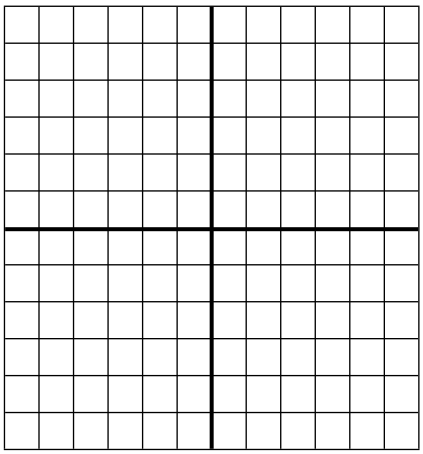
MCC9-12.A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context.

Acting Out

Erik and Kim are actors at a theater.

Erik lives 5 miles from the theater and Kim lives 3 miles from the theater.
Their boss, the director, wonders how far apart the actors live.

- On grid paper, pick a point to represent the location of the theater.
- Illustrate all of the possible places that Erik could live on the grid paper.
- Using a different color, illustrate all of the possible places that Kim could live on the grid paper.
- What is the smallest distance, d, that could separate their homes? How did you know?
- What is the largest distance, d, that could separate their homes? How did you know?
- Write and graph an inequality in terms of d to show their boss all of the possible distances that could separate the homes of the 2 actors.



Pick two points where Erik and Kim could possibly live. Use the Pythagorean Theorem to find the distance between them. Does your answer fall within the range you wrote down to give to their boss?

Constraints in Decision Making – Concession Stand Dilemma

Jimmy is at a Lil Hawks basketball game watching his younger brother Johnny play. He is hungry and asks his mom, Joni, for some money. She is gracious and gives him $10 to spend on all 3 of them. The concession stand is selling hot dogs for a dollar and hamburgers for $2. She tells him not to buy a drink since she already has one. Jimmy gets to the counter and starts wondering what combinations he can get for his $10.

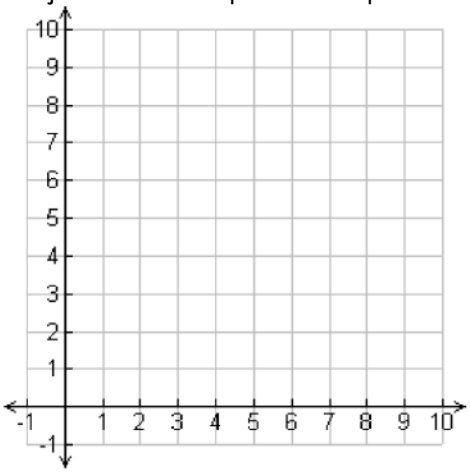
1) Write an equation using 2 variables to represent Jimmy's purchasing decision. Define your variables. d = number of hot dogs h = number of hamburgers

2) Use your equation to figure out how many hot dogs he can buy if he gets 3 hamburgers.

3) How many hot hamburgers can he get if he buys 2 hot dogs?

4) Solve your equation for hot dogs, d, in terms of the number of hamburgers, h.

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



6) Find the minimum and maximum number of hot dogs he can buy. Write your answer as an inequality in terms of d, the number of hot dogs.

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

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

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

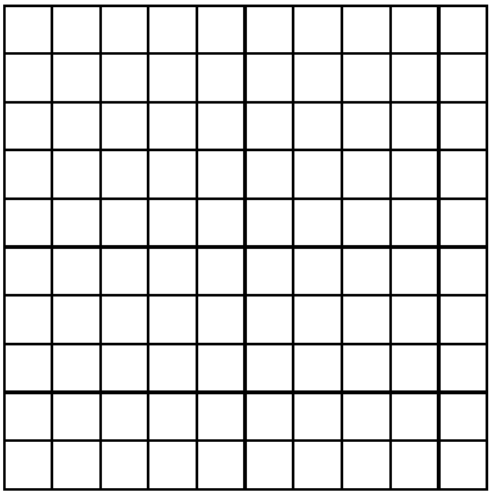
1) Write an equation using 2 variables to represent Larry's purchasing decision. Define your variables. c = pounds of chicken s = number of steaks

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

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

4) Solve your equation for pounds of chicken, in terms of the pounds of steak, s.

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



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.

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.

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

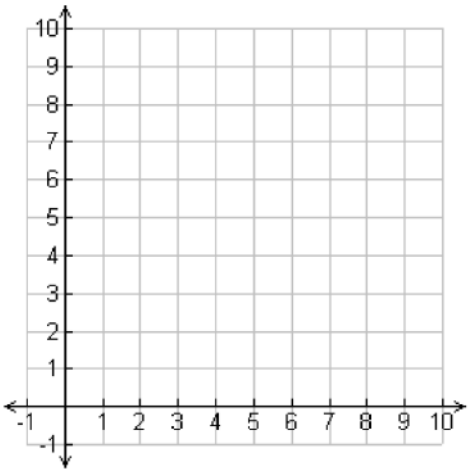
Constraints in Decision Making – Beth's Bags

Beth is at a store having a sale on purses. The big purses are going for $20 each, and the small purses are going for $10 each. She has $80 to spend.

1) Write an equation using 2 variables to represent Beth's purchasing decision. Define your variables. b = number of big pursess = number of small purses

2) Solve your equation for big purses, in terms of the number of small purses, s.

3) Graph the equation you just came up with in problem #2.



4) How many big purses can she get if she buys 3 small purses?

5) How many small purses can she buy if she buys 2 big purses?

6) Is it possible for her to buy 3 of each kind of purse?