Talk with your groups about this problem and come up with a rule or formula. I will get you your poster paper soon.

$f(x) = ax^2 + bx + c$ $n^2 + 2n + 1$

For the following sequence of figures, assume the pattern continues to grow in the same manner. Describe what the nth figure will look like and determine the number of blocks that would be needed for this figure with a rule or formula.
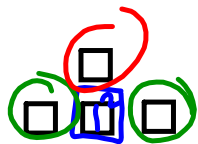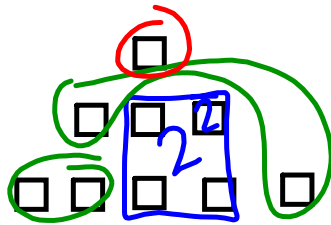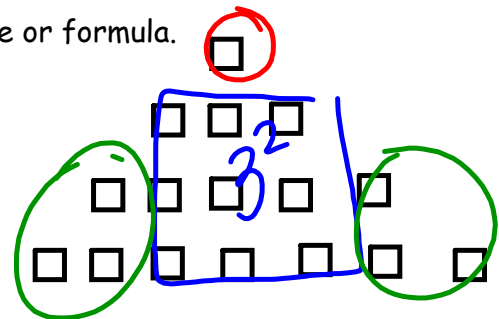
Figure 1   Figure 2   Figure 3

*Make a poster of your groups answers and thinking. Link the diagram to your rule or formula to determine the number of cubes in the nth tower. Be ready to explain your group's thinking to the class!

x	y
1	4
2	9
3	16
4	25

$(x+1)^2$

1.1 Brutus Bites Back
A Develop Understanding Task

Remember Carlos and Clarita? A couple of years ago, they started earning money by taking care of pets while their owners are away. Due to their amazing mathematical analysis and their loving care of the cats and dogs that they take in, Carlos and Clarita have made their business very successful. To keep the hungry dogs fed, they must regularly buy Brutus Bites, the favorite food of all the dogs.

Carlos and Clarita have been searching for a new dog food supplier and have identified two possibilities. The Canine Catering Company, located in their town, sells 7 pounds of food for $5.

Carlos thought about how much they would pay for a given amount of food and drew this graph:
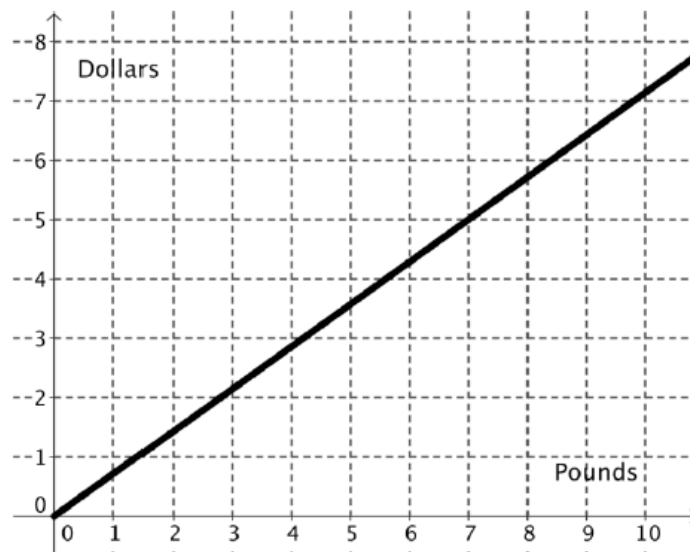
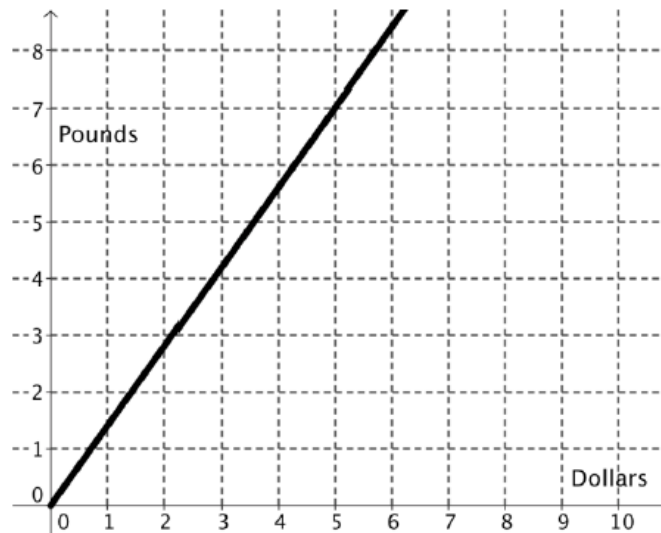1. Write the equation of the function that Carlos graphed.

$$y = \frac{5}{7}x \qquad D = \frac{5}{7}P \qquad D(p) = \frac{5}{7}P$$

$y(x)$

pounds in terms of dollars

Clarita thought about how much food they could buy for a given amount of money and drew this graph:

2. Write the equation of the function that Clarita graphed.

$$y = \frac{7}{5}x \qquad P(d) = \frac{7}{5}d$$

3. Write a question that would be most easily answered by Carlos' graph. Write a question that would be most easily answered by Clarita's graph. What is the difference between the two questions?

Clarita: How many pounds ...... ?

Carlos: How much will we spend for...?

4. What is the relationship between the two functions? How do you know?

Inverses; axes switch; both graphs represent the same scenario; slopes are reciprocals $\left(\frac{7}{5} \leftrightarrow \frac{5}{7} \right)$

Mar 3-1:59 PM

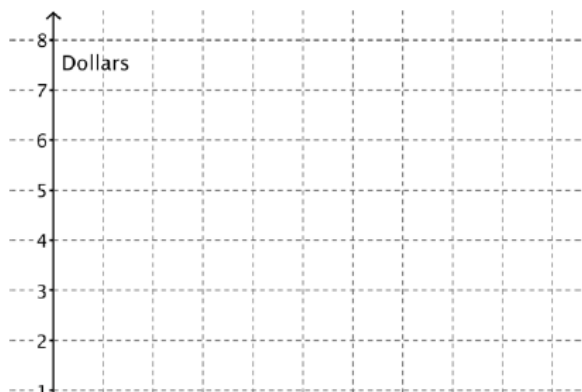$f(x)$ $\longrightarrow f^{-1}(x)$ is the inverse of f.

5. Use function notation to write the relationship between the functions.

$D(p) = P^{-1}(d)$ $P(d) = D^{-1}(p)$

Carlos' graph is Clarita's inverse / Clarita's graph is Carlos' inverse

Looking online, Carlos found a company that will sell 8 pounds of Brutus Bites for $6 plus a flat $5 shipping charge for each order. The company advertises that they will sell any amount of food at the same price per pound.

6. Model the relationship between the price and the amount of food using Carlos' approach.

7. Model the relationship between the price and the amount of food using Clarita's approach.
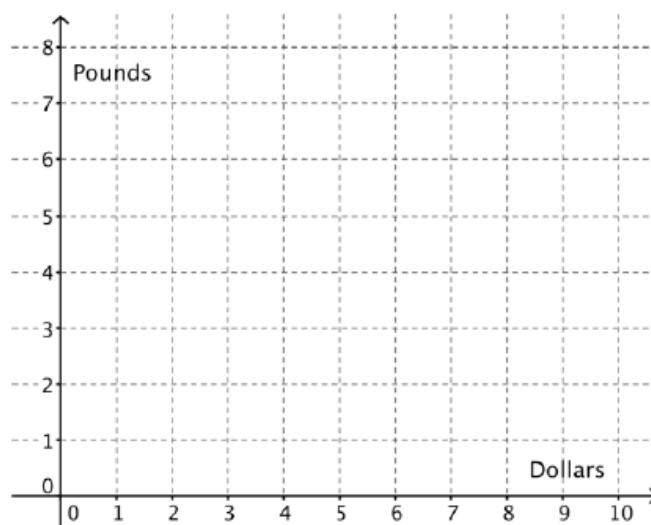
8. What is the relationship between these two functions? How do you know?

9. Use function notation to write the relationship between the functions.

10. Which company should Clarita and Carlos buy their Brutus Bites from? Why?

Mar 3-2:01 PM

Homework/Classwork

Finish 1.1