

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## DISCRETE FUNCTIONS COMMON CORE ALGEBRA I HOMEWORK

### APPLICATIONS

- In each of the following cases, two variables are related by a function. In each situation, determine whether the function is **continuous** or **discrete**. Explain your thinking.
  - The height,  $h$ , of an object above the ground can be modeled as a function of time,  $t$ , by the equation  $h = 200 - 16t^2$ .
  - The cost  $C$  of a charter bus trip depends on the number of people,  $n$ , who go on the trip. This dependence can be shown in the equation  $C = 22.50n$ .
- Which of the following would be an example of two variables related with a discrete function.
  - The volume of water in a swimming pool and the amount of time it has been filling.
  - The cost of buying pens and the number of pens purchased.
  - The area of a square garden and the length of the side of the garden.
  - The mean temperature of a planet and its distance from the sun.
- Maxwell is attempting to determine the volume of a penny in cubic centimeters. He does an experiment where he drops pennies into water and records the volume, in milliliters. The data is shown below.

|                   |      |      |      |      |      |      |      |
|-------------------|------|------|------|------|------|------|------|
| Number of Pennies | 0    | 1    | 2    | 3    | 4    | 5    | 6    |
| Volume (mL)       | 10.5 | 10.8 | 11.1 | 11.4 | 11.7 | 12.0 | 12.3 |

- Explain why the volume is a discrete function.
- Graph the data from the chart on the grid below.
 

(c) Write an equation for the volume,  $v$ , as a function of the number of pennies,  $p$ , placed in the water. This is a discrete linear function.

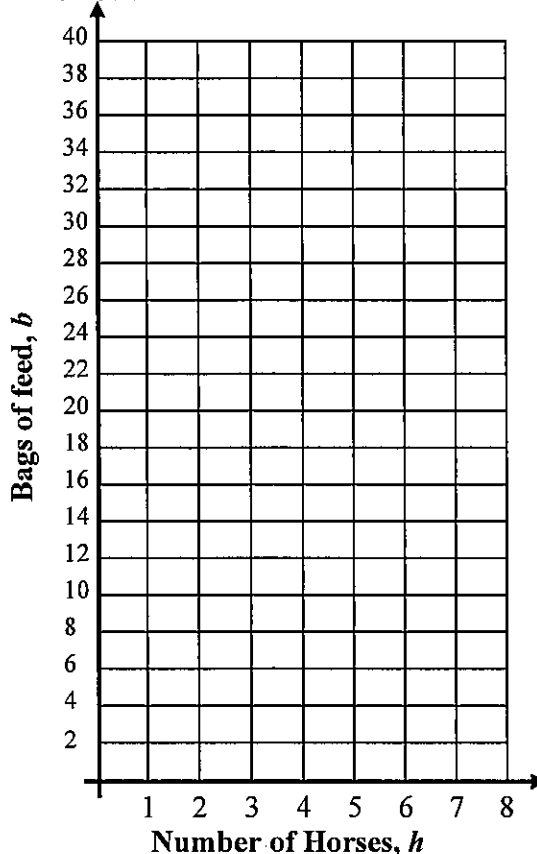
(d) One milliliter is equivalent to one cubic centimeter. What is the volume of one penny in cubic centimeters?



4. Shana is trying to make sure that a local farm has enough bags of horse feed to last the week. She knows she wants to have 3 bags of feed per horse and a reserve of 8 bags as well.

(a) Determine an equation for the number of bags,  $b$ , that Shana should plan on as a function of the number of horses,  $h$ , present on the farm.

(b) Create a graph of your equation on the grid below.



(c) Using your equation from (a), how many bags of feed should Shana keep stocked if the farm has 15 horses?

(d) Using your equation from (a), how many horses can be on the farm if Shana has 62 bags of feed?

5. An amusement park models the amount of wait-time,  $W$ , in minutes for a ride based on the number of people,  $n$ , standing in line. The equation they determine is:

$$W(n) = 0.4n + 12$$

(a) Explain why this is an example of a discrete function.

(b) Interpret the fact that  $W(10) = 16$ . In other words, what does this mean in terms of the scenario being modeled.

(c) If the park estimates that the wait time is 45 minutes, then how many people must be standing in line for this exact wait time? Why is this not a viable solution?

