Name _____   Date _____

1. It is a Saturday morning, and Jeremy has discovered he has a leak coming from the water heater in his attic. Since plumbers charge extra to come out on weekends, Jeremy is planning to use buckets to catch the dripping water. He places a bucket under the drip and steps outside to walk the dog. In half an hour, the bucket is $\frac{1}{5}$ of the way full.

    a. What is the rate at which the water is leaking per hour?

    b. Write an equation that represents the relationship between the number of buckets filled, y, in x hours.

    c. What is the longest that Jeremy can be away from the house before the bucket will overflow?

2. Farmers often plant crops in circular areas because one of the most efficient watering systems for crops provides water in a circular area. Passengers in airplanes often notice the distinct circular patterns as they fly over land used for farming. A photographer takes an aerial photo of a field on which a circular crop area has been planted. He prints the photo out and notes that 2 centimeters of length in the photo corresponds to 100 meters in actual length.
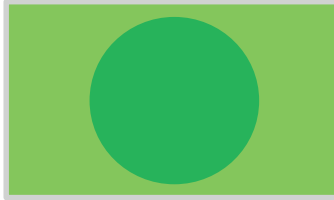
a. What is the scale factor of the actual farm to the photo?

b. If the dimensions of the entire photo are 25 cm by 20 cm, what are the actual dimensions of the rectangular land area in meters captured by the photo?

c. If the area of the rectangular photo is 500 cm^2, what is the actual area of the farm in square meters?

3. A store is having a sale to celebrate President's Day. Every item in the store is advertised as one-fifth off the original price. If an item is marked with a sale price of $140, what was its original price? Show your work.

4. Over the break, your uncle and aunt ask you to help them cement the foundation of their newly purchased land and give you a top-view blueprint of the area and proposed layout. A small legend on the corner states that 4 inches of the length corresponds to an actual length of 52 feet.
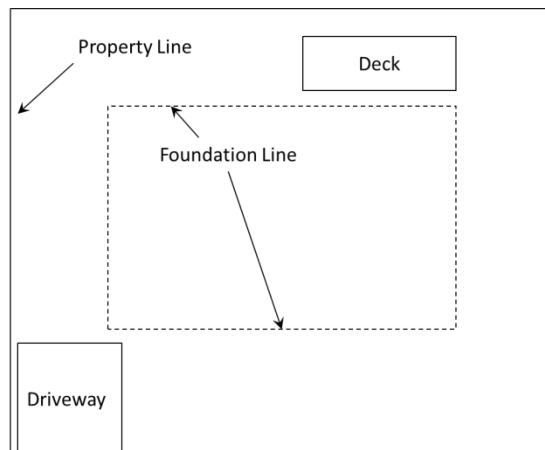
a. What is the scale factor of the actual foundation to the blueprint?

b. If the dimensions of the foundation on the blueprint are 11 inches by 13 inches, what are the actual dimensions in feet?

c. You are asked to go buy bags of dry cement and know that one bag covers 350 square feet. How many bags do you need to buy to finish this project?

d. After the first 15 minutes of laying down the cement, you have used $\frac{1}{5}$ of the bag. What is the rate you are laying cement in bags per hour? What is the unit rate?

e. Write an equation that represents the relationship between the number of bags used, y, in x hours.

f. Your uncle is able to work faster than you. He uses 3 bags for every 2 bags you use. Is the relationship proportional? Explain your reasoning using a graph on a coordinate plane.

g. What does $(0, 0)$ represent in terms of the situation being described by the graph created in part (f)?

h. Using a graph, show how many bags you would use if your uncle uses 18 bags.