Name: _____ Date: _____ Period: _____

Sec 1H Unit 3 Day 5 - Decay Classwork

1. Suppose that the portfolio of Dogbert's customer starts with $100,000. No money is added, and the fee is taken from the portfolio account once a year. How much money will be in the customer's portfolio after the 1st year? Show two different ways to find the solution.

2. Suppose that nothing is added to the customer's portfolio, but Dogbert continues to collect his yearly fee.

a. How much money will be in the customer's portfolio after the 2nd year?

b. How much money will be in the portfolio after the 3rd year?

c. How much money will be in the portfolio after the 4th year?

3. Joe claims that if the portfolio loses 10% each year then after 4 years it will lose 40%, or $40,000. Moe claims the portfolio will actually lose less than $40,000 after 4 years. Show who is correct and provide evidence to back up your claims.

4. a) What kind of sequence is represented by the situation?
b) Is it a linear or exponential function?
c) Does it represent growth or decay?
d) Write an equation to represent the amount A of money left in the portfolio after t years.
e) How much money will be in the customer's account after 10 years?
f) After how many years will there be less than $5,000 in the account?
g) After how many years will there be less than $1 in the account?

6. Make a table for the function using the values from problems 1, 2, and 4.

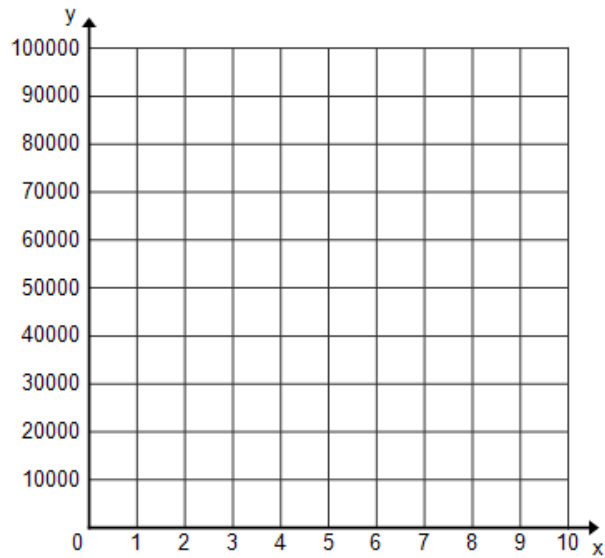| Year	0	1	2						
value									

7. Draw a graph of the function.

Tell whether the equation represents exponential decay or exponential growth:

8. $y = 0.345(1.06)^x$

9. $y = 345(0.87)^x$

After an animal receives a preventive flea medicine, the medicine breaks down in the animal's bloodstream. With each hour, there is less medicine in the blood. The table and the graph show the amount of medicine in a dog's bloodstream each hour for 6 hours after receiving a 400 milligram dose.


Breakdown of Medicine
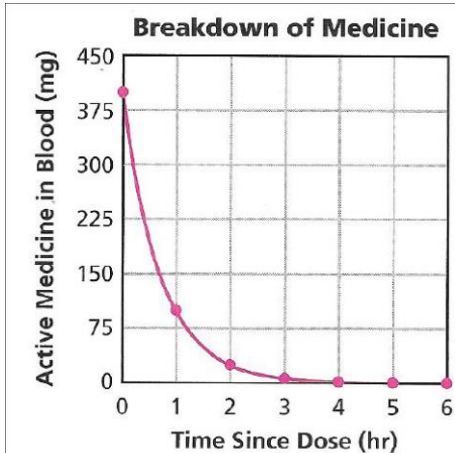
Time Since Dose (hr)	Active Medicine in Blood (mg)
0	400
1	100
2	25
3	6.25
4	1.5625
5	0.3907
6	0.0977

10. How does the amount of active medicine in the dog's blood change from one hour to the next?

11. Write an equation to model the relationship between the number of hours h since the dose is given and the milligrams of active medicine m.

12. Dwayne was confused by the terms decay rate and decay factor. He said that because the rate of decay is 20%, the decay factor should be 0.2, and the equation should be m = $60(0.2)^h$. How would you explain to Dwayne why a rate of decay of 20% is equivalent to a decay factor of 0.8?
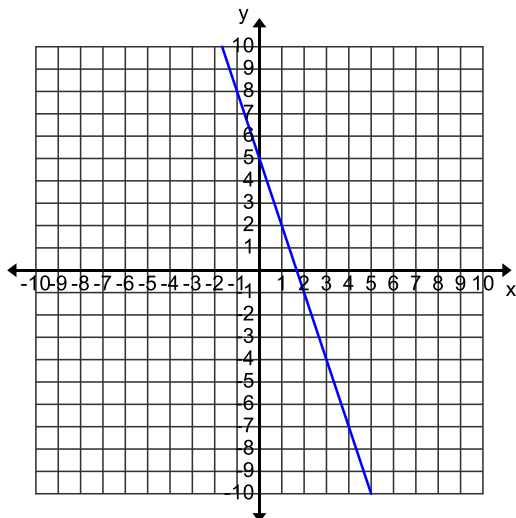
13. Hot cocoa is poured into a cup and allowed to cool. The difference between cocoa temperature and room temperature is recorded every minute for 10 minutes. Given the graph of this relationship, fill in the table, approximate the decay factor and use it to **write an equation.**
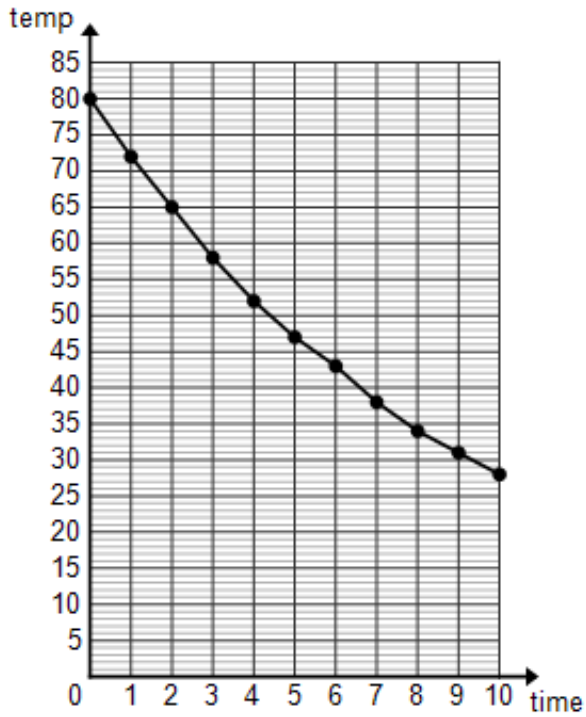
Time (min)	Temp Difference
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

14. Write two equations for each graph:

a)

b)