

Name \_\_\_\_\_

1. (2 points) Given that  $F(0) = 20$  and  $F(n+1) = 0.84F(n) + 40$ , make a table of values for  $F$  with  $n = 0, 4, 8, 12$ , and  $16$ . If you observe the behavior of this function for larger values of  $n$ , what long term behavior do you observe?

2. (2 points) Suppose that  $h$  is a function of  $t$  and takes on the values shown in the following table.

$t$	$h$
0	3
1	9
2	15
3	21
4	27
5	33

(a) Determine a discrete dynamical system along with an initial value for this function.

(b) Determine an explicit formula for this function.

3. (3 points) Suppose that a patient takes a daily dose of 4.5 milligrams of some drug, and that each day the kidneys filter out 10% of this drug from the patient's bloodstream.

(a) Determine a discrete dynamical system along with an initial value for  $d(t)$ , the number of milligrams of this drug in this patient's bloodstream  $t$  days after the initial dose.

(b) How many milligrams of this drug are in the bloodstream 5 days after the initial dose?

(c) Assuming that the patient is to continue taking this drug for a long time, what was the doctor's **target goal** for the desired amount of this drug in the bloodstream?

4. (3 points) There are currently 400 people living in a small town which is projected to grow by 8% each year. Let  $P(t)$  represent the population of the town  $t$  years from now.

(a) Find a discrete dynamical system along with an initial value for  $P(t)$ .

(b) Find an explicit formula for  $P(t)$ .

(c) In what year will the population reach 2000 people?