

1. Suppose that n is a function of t and takes on the values shown in the following table. Determine a discrete dynamical system along with an initial value for this function. Determine an explicit formula for this function.

t	n
0	2
1	5
2	8
3	11
4	14

2. Suppose that u is a function of n and takes on the values shown in the following table. Determine a discrete dynamical system along with an initial value for this function. Determine an explicit formula for this function.

n	u
0	3
1	6
2	12
3	24
4	48

3. Suppose that P is a function of t and takes on the values shown in the following table. Determine a discrete dynamical system along with an initial value for this function. Determine an explicit formula for this function.

t	P
0	1
1	3
2	7
3	15
4	31

4. A doctor determines that her heart patient needs the drug digoxin and prescribes a dose of 1 milligram per day. However, the kidneys remove one third of the digoxin from the patient's blood each day.
- (a) Determine a discrete dynamical system along with an initial value for $d(t)$, the number of milligrams of digoxin in this patient's bloodstream t days after the initial dose is taken.
 - (b) Make a table of values for the amount of digoxin in this patient's bloodstream for the first week of taking this medication.
 - (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?

5. For each discrete dynamical system given, make a table of values with the independent variable taking on the values 0, 1, 2, 3, 4, and 5.

(a) $P(t + 1) = P(t) + 3.5$ and $P(0) = 10$

(b) $u(n) = u(n - 1) - 4$ and $u(0) = 87$

(c) $q(t + 1) = 0.8q(t)$ and $q(0) = 100$

(d) $v(n + 1) = 1.2v(n)$ and $v(0) = 25$

(e) $B(t) = 2B(t - 1) + 1$ and $B(0) = 2$

(f) $w(n) = 0.6w(n - 1) + 30$ and $w(0) = 3$

6. Find explicit formulas for at least four of the functions given in question 5.

7. Suppose that w is a function of n and takes on the values shown in the following table. Determine a discrete dynamical system along with an initial value for this function. Determine an explicit formula for this function.

n	w
0	64
2	32
4	16
6	8
8	4

8. Suppose that Q is a function of t and takes on the values shown in the following table. Determine a discrete dynamical system along with an initial value for this function. Determine an explicit formula for this function.

t	Q
0	15
2	12
4	9
6	6

9. Suppose that v is a function of n and takes on the values shown in the following table. Determine a discrete dynamical system along with an initial value for this function. Determine an explicit formula for this function.

n	v
0	768
1	576
2	432
3	324
4	243

10. Suppose that a patient takes a daily dose of 2 milligrams of some drug, and that each day the kidneys filter out 25% of this drug from the patient's bloodstream.
- Determine a discrete dynamical system along with an initial value for the number of milligrams of this drug in this patient's bloodstream each day.
 - How many milligrams of this drug are in the bloodstream 3 days after the initial dose?
 - 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?
11. Every twelve hours a patient takes 1 milligram of some drug. Every twelve hours the kidneys filter out 20% of this drug from the patient's bloodstream.
- Determine a discrete dynamical system along with an initial value for the number of milligrams of this drug in this patient's bloodstream as a function of time. State precisely what each variable represents in this system.
 - How many milligrams of this drug are in the bloodstream one week after the initial dose?
 - 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?
12. The radius of an oil spill is currently 150 feet, and it is increasing by 5 feet per hour. Let $r(t)$ represent the radius of the oil spill t hours from now.
- Find a discrete dynamical system along with an initial value for $r(t)$.
 - Find an explicit formula for $r(t)$.
 - When will the radius of the oil spill be 200 feet?
13. The population of a town is currently 2500, and it is decreasing by 10 people per year. Let $P(t)$ represent the population of this town t years from now.
- Find a discrete dynamical system along with an initial value for $P(t)$.
 - Find an explicit formula for $P(t)$.
 - What population will this town have in 15 years?
14. The number of rabbits on an island is currently 600, and it is increasing by 8.5% per year. Let $R(t)$ represent the number of rabbits on this island t years from now.
- Find a discrete dynamical system along with an initial value for $R(t)$.
 - Find an explicit formula for $R(t)$.
 - How many years will it take for the rabbit population on this island to double in size?

15. An automobile is currently worth \$20,000, and its value is decreasing by 15% per year. Let $V(t)$ represent the value of the automobile t years from now.
- (a) Find a discrete dynamical system along with an initial value for $V(t)$.
 - (b) Find an explicit formula for $V(t)$.
 - (c) What will the value of the automobile be in 10 years?
16. A doctor prescribes an initial dose of 150 milligrams of some drug. This is to be followed by a maintenance dose of 30 milligrams each day. Suppose that 10% of the amount of this drug in the bloodstream is eliminated via the kidneys each day. Let $u(n)$ represent the number of milligrams of this drug in the patient's body n days after the initial dose.
- (a) Determine a discrete dynamical system along with an initial value for $u(n)$.
 - (b) How many milligrams of this drug are in the bloodstream 5 days after the initial dose?
 - (c) After the initial dose, it takes between _____ and _____ days for the amount of drug in the bloodstream to reach a level of 250 milligrams.
 - (d) 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?
17. Given that $u(0) = 10$ and $u(n) = 0.8u(n - 1) + 3.5$, make a table of values for u with $n = 0, 10, 20, 30, 40$, and 50. What long term behavior do you observe?
18. Given that $P(0) = 8$ and $P(t) = -0.2P(t - 1) + 36$, make a table of values for P with $t = 0, 1, 2, 3, 4, 5, 6$, and 7. What long term behavior do you observe?
19. Given that $W(0) = 100$ and $W(t + 1) = 1.35W(t)$, make a table of values for W with $t = 0, 7, 14, 21, 28, 35, 42$, and 49. What long term behavior do you observe?
20. Given that $h(0) = 100$ and $h(n + 1) = 0.95h(n) + 12$, make a table of values for h with $n = 0, 10, 20, 30, 40$, and 50. What long term behavior do you observe?
21. Given that $h(0) = 240$ and $h(n + 1) = 0.95h(n) + 12$, make a table of values for h with $n = 0, 1, 2, 3, 4$, and 5. What interesting feature does this table possess?