

Name _____

1. (3 points) A \$100,000 loan with a 9.6% annual interest rate compounded monthly must be paid back in 360 monthly payments. Since the bank rounds up each payment to the next penny, the first 359 payments will be equal but the last payment will be lowered.

(a) Write down a discrete dynamical system with initial condition to represent the balance of the loan just after each month's payment. Hint: The first 359 monthly payments will either be \$848.15 or \$848.16.

(b) What is the amount of each of the first 359 monthly payments?

(c) What is the amount of the last monthly payment?

2. (3 points) Find the equilibrium value for the following dynamical system.

$$u(n) = -0.85u(n-1) + 160.95$$

3. (4 points) Find the equilibrium point or points, if any exist, for the following dynamical system of 2 equations.

$$u(n) = u(n-1) + 0.5v(n-1) - 3$$

$$v(n) = u(n-1) + 1.5v(n-1) - 5$$