3. (Discrete Logistic Equation) Consider the following discrete-time dynamical system, which is called the discrete logistic equation and which models the size of a population over time:

$$N_{t+1} = N_t\left[1 + R\left(1 - \frac{N_t}{K}\right)\right]$$

for $t = 0, 1, 2, \ldots$

(a) (i) Find all equilibrium points and study their stability when $R = 0.5$ and $K = 100$.

   (ii) Investigate the system when $N_0 = 10$ and describe what you see (you need to draw a chart describing the values of the sequence).

(b) (i) Find all equilibrium points and study their stability when $R = 1.5$ and $K = 100$.

   (ii) Investigate the system when $N_0 = 10$ and describe what you see (you need to draw a chart describing the values of the sequence).

(c) (i) Find all equilibrium points and study their stability when $R = 2.5$ and $K = 100$.

   (ii) Investigate the system when $N_0 = 10$ and describe what you see (you need to draw a chart describing the values of the sequence).