

Name _____

For problems #1–5, each population can be modeled by the following discrete dynamical system

$$u(n) = u(n - 1) + R \cdot u(n - 1)$$

where R is a function of the population u .

For each of these problems, the graph of R is given and you should answer the following questions.

- (a) What is the intrinsic growth rate for this population?
- (b) Does this population have a carrying capacity? If so, determine its value.
- (c) Find a formula for R and use this to write down the appropriate discrete dynamical system for this population.
- (d) Find all non-negative equilibrium values for this population and state whether they are stable or unstable.
- (e) Sketch a rough graph of the population as a function of time, being sure to show each equilibrium value clearly and being sure to show what happens to any initial populations which are above or below each positive equilibrium value.
- (f) For each stable equilibrium value, find the maximum interval of stability.
- (g) For each stable equilibrium value, find the rate at which the population approaches equilibrium.
- (h) Does this population have a minimum viable population? If so, determine its value.