

Math 246, Review problems for Midterm II.

1. Consider a discrete time dynamical system $b_{t+1} = b_t - 2$ with the initial condition $b_0 = 500$. Write a closed-form expression for b_t .
2. Consider a discrete time dynamical system $M_{t+1} = 2\sqrt{M_t} + 3$ with the initial condition $M_0 = 3$. What is M_{1000} approximately?
3. Find the fixed points and determine their stability for the dynamical system $a_{t+1} = a_t^2 - 1$.
4. Find stable fixed points for the dynamical system $N_{t+1} = \frac{2N_t}{2N_t+1}$.
5. Find the global maximum and minimum of the function $f(x) = x - \sqrt{x}$ on the interval $[0, 1]$.
6. Find the local maxima and minima of the function $f(x) = x^3 - 3x + 2$.
7. What is global maximum of the function $f(t) = t^2(1 - t)^3$ on the interval $[0, 1]$?
8. Find global extrema of the function $f(x) = x^3 - x^2$ on the interval $[-1, 1]$.
9. Find two nonnegative numbers whose sum is 9 and so that the product of one number and the square of the other number is a maximum.
10. An open rectangular box with square base is to be made from 48 square feet of material. What dimensions will result in a box with the largest possible volume ?