Mathematics 172

Quiz 20 **Name:** Kee K

You must show your work to get full credit.

A population grows by rule

$$N_{t+1} = \frac{.3N_t + .2N_t^2}{1 + .01N_t^2}$$

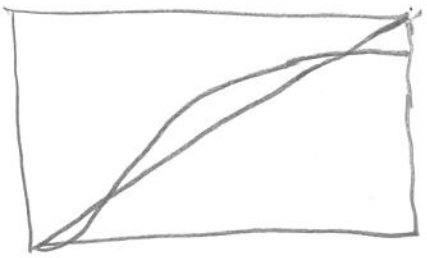
1. If $N_0 = 10$ compute N_1 and N_2

$N_1 =$ 11.5 $N_2 =$ 12.87

\Y1 = (.3X +.2X^2)/(1+.01X^2) Xmin=0, Xmax=20
For N_1 2nd calc 1:value X=10 Y= 11.5 = N_1
For N_2 2nd calc 1:value X = alpha Y = 12.87 = N_2

2. Plot `\Y1 = (.3X + .2X^2)/(1 + .01X^2)` and `\Y2 = X` with `Xmin = 0` and `Xmax = 20`. Make a sketch of the graph here.

use 2nd calc
5: intersect
Then
6: dy/dx



3. Your graph should show that there are 3 equilibrium points. Give the points, the value of the slope at the point and if the point is a stable point.

(a) First point:
Value 0 dy/dx= .3 Stable? (yes or no) Yes

(b) Second point:
Value 4.52 dy/dx= 1.412 Stable? (yes or no) NO

(c) Third point:
Value 15.98 dy/dx= .050 Stable? (yes or no) Yes

4. If $N_0 = 10$ estimate N_{100}. $N_{100} \approx$ 15.48

5. If $N_0 = 2$ estimate N_{73}. $N_{73} \approx$ 0