Quiz #24

Mathematics 172

Name: Key

You must show your work to get full credit.

Two competing of rotifers live in a tea cup that was been left outside and fulled with water. If the numbers of the two species are related by the Lotka-Volterra equations

$$\frac{dx}{dt} = .32x\left(\frac{600 - x - .4y}{600}\right)$$
$$\frac{dy}{dt} = .25y\left(\frac{400 - y - .3x}{400}\right)$$

1. Find the all equilibrium points of these equations. This may require the use of your calculator. (To give the equilibrium points you have to give an ordered pair (x, y).)

The equilibrium points are: (0,0) (600,0), (0,400), (500,250

To get an idea where they should be draw out of the picture for problem 2

\Y1=(600−X)/.4

\Y2=400−.3X

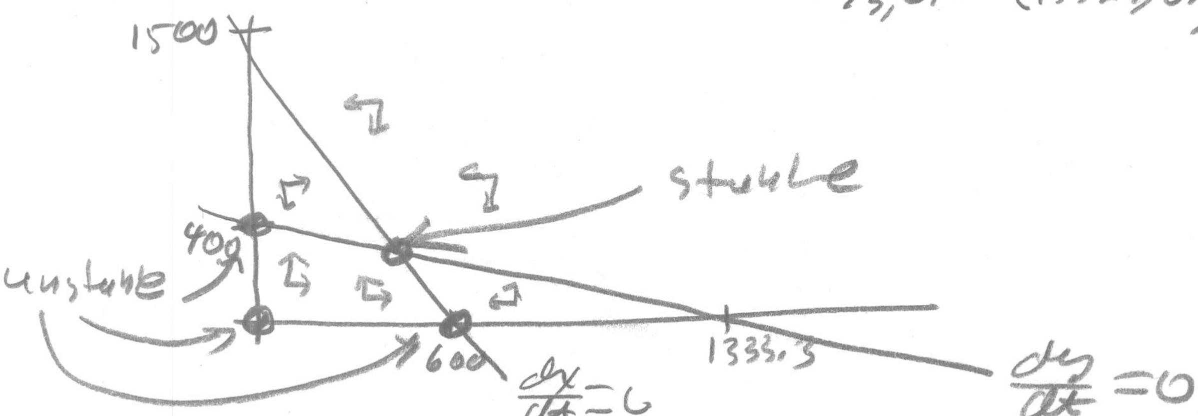
Xmin=0 Xmax=600

use 2nd calc 5:intersect to find X=500 Y=250

2. Draw the phase portrait of the equations showing all the equilibrium points, some arrows show which way points are moving, and label the equilibrium points as to be stable or unstable.

600−x−.4y=0 intercepts (600,0), (0, 600/.4)=(0,1500)

400−y−.3x=0 intercepts (400/.3,0)=(1333.3,0), (0,400)



3. Describe the long term behavior of the competition. That is competitive exclusion, competitive coexistence, species x dominates, or species y dominates (**circle one**).