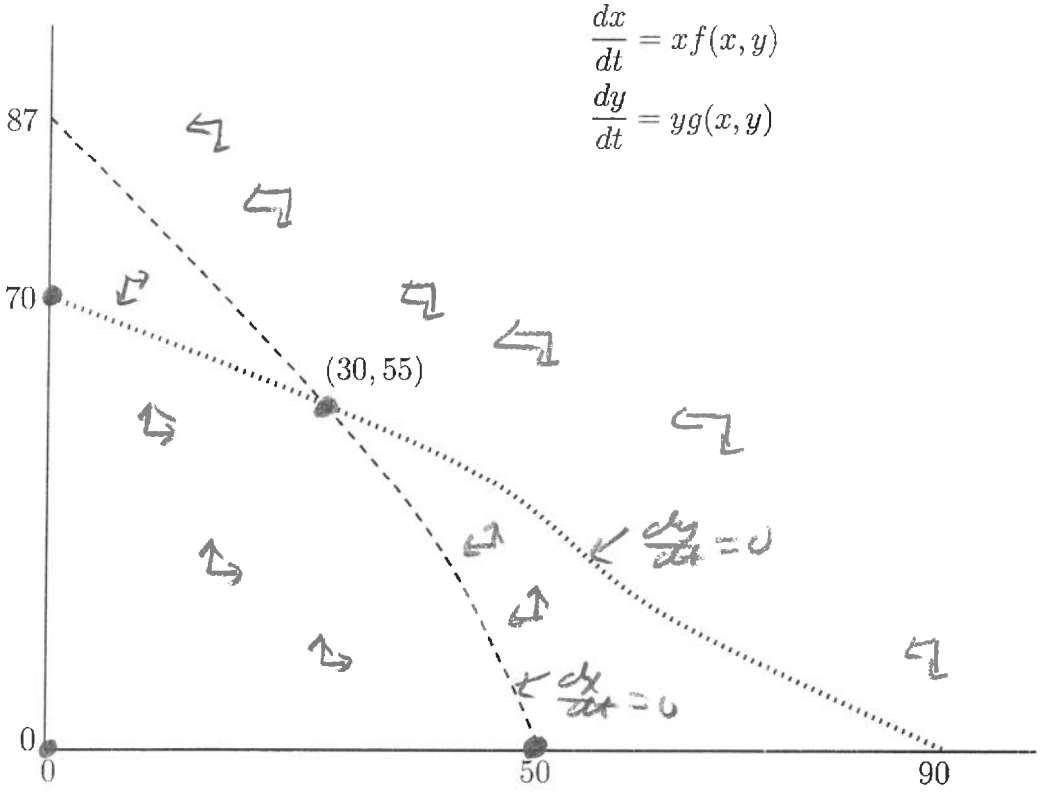
Mathematics 172

Quiz 22 Name: Key

You must show your work to get full credit.

The figure below is the phase space for the rate equations

$$\frac{dx}{dt} = xf(x,y)$$
$$\frac{dy}{dt} = yg(x,y)$$



- - - - - - - - - - - - - - - Curve where $f(x,y) = 0$ and $f(x,y) > 0$ below this curve.

..... Curve where $g(x,y) = 0$ and $g(x,y) > 0$ below this curve.

1. What are the rest points?

   Rest points are: (0,0), (50,0), (0,70), (30,55)

2. Put in arrows showing the direction of the motion of points in each of the regions.

3. Which of the rest points are stable? Stable points are: (30,55)

4. If there is no y species present, that what would be the size of the stable x population?

   Population size is: 50

5. If $x(0) = 20$ and $y(0) = 35$, estimate $x(50)$ and $y(50)$.

   $x(50) \approx$ 30 $y(50) \approx$ 55