

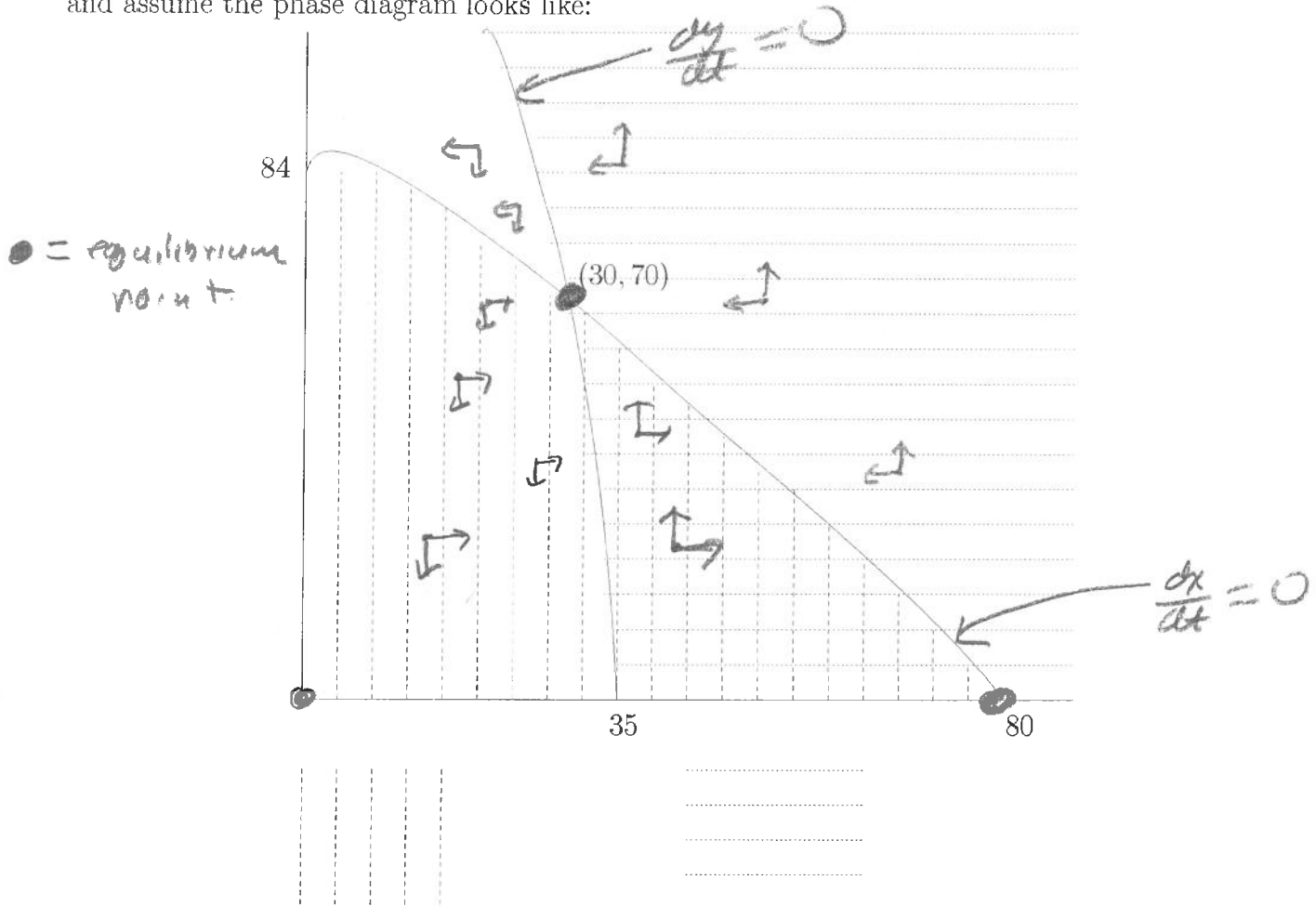
*You must show your work to get full credit.*

Consider a system of rate equations relating the sizes of the populations of two species, the  $x$ -species and the  $y$ -species:

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

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

and assume the phase diagram looks like:



$f(x, y) > 0$  shaded like this

$g(x, y) > 0$  shaded like this

1. Label the curved line where  $\frac{dx}{dt} = 0$

2. Label the curved line where  $\frac{dy}{dt} = 0$

3. What are the equilibrium points?

The points are (0, 0), (80, 0), (30, 70)

4. Put in arrows which show which way a point is moving in each of the regions.