Mathematics 172

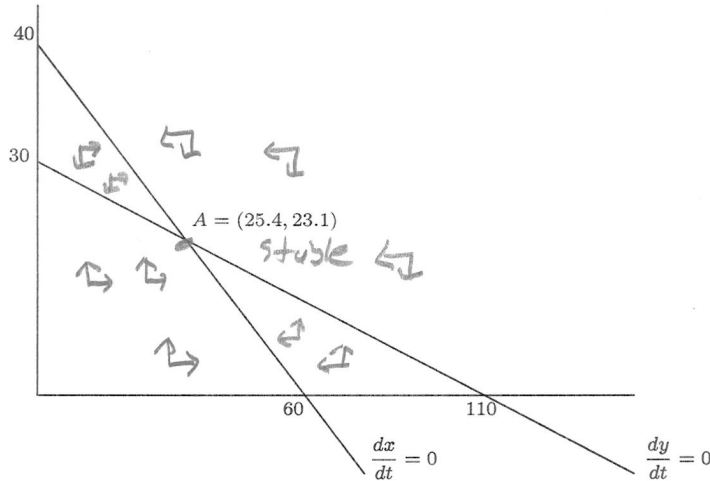Quiz #22   Name: _____ key _____

You must show your work to get full credit.

There are two competing species of duckweed in a rain barrel. Let $x(t)$ be number the first species and $y(t)$ the number of the second species t weeks after the barrel is left out.
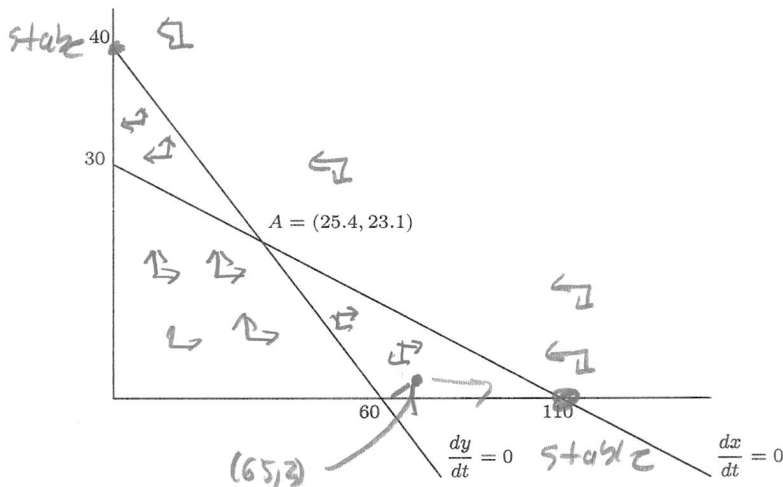
1. If the phase diagram for the two species looks like

A = (25.4, 23.1) stable

$\frac{dx}{dt} = 0$ $\frac{dy}{dt} = 0$

(a) Is the equilibrium point at A stable? _____ Yes _____

(b) It we start with $x(0) = 65$ and $y(0) = 3$ estimate

$x(100) \approx$ _____ 25.4 _____ $y(100) \approx$ _____ 23.1 _____

2. If the phase diagram for the two species looks like

Stable 40

A = (25.4, 23.1)

(65,3) $\frac{dy}{dt} = 0$ stable $\frac{dx}{dt} = 0$

(a) Is the equilibrium point at A stable? _____ NO _____

(b) It we start with $x(0) = 65$ and $y(0) = 3$ estimate

$x(100) \approx$ _____ 110 _____ $y(100) \approx$ _____ 0 _____