Quiz # 25   Name: _____Key_____

You must show your work to get full credit.

The following are rate equations for the numbers of two competing species of small fish in a pond.

$$\frac{dx}{dt} = .15x \left(\frac{300 - x - 1.5y}{300} \right)$$

$$\frac{dy}{dt} = .2y \left(\frac{500 - 4x - y}{500} \right)$$

1. What are

Carrying capacity of x species without y-species? _____300_____

Carrying capacity of y species without x-species? _____500_____

Intrinsic growth rate of x-species? _____.15_____

Intrinsic growth rate of y-species? _____.2_____

2. At some time t we have $x(t) = 50$ and $y(t) = 200$.

$$\frac{dx}{dt} = .15(50) \left(\frac{300 - 50 - (1.5)(200)}{300} \right)$$ What is $\frac{dx}{dt}$ _____-1.25_____

$$\frac{dy}{dt} = .2(200) \left(\frac{500 - 4(50) - 200}{500} \right)$$ What is $\frac{dy}{dt}$ _____8_____

At this time is x **increasing** or (decreasing?) (Circle one.) $\left(as \; \frac{dx}{dt} < 0 \right)$

At this time is y (increasing) or **decreasing**? (Circle one.) $\left(as \; \frac{dy}{dt} > 0 \right.$