Quiz 5 - Two-species Stability Analysis

My name is: _____

1) Determine the elements of the Community Matrix **A** for the two-species model

$$\frac{dX}{dt} = (a - bY)X$$
$$\frac{dY}{dt} = (pbX - q)Y\,,$$

remembering that, generally-speaking,

$$A_{ij} = \left.\frac{\partial \frac{dx_i}{dt}}{\partial x_j}\right|_{\vec{N}^*}.$$

2) What is the biological interpretation of elements A_{12} and A_{21}?

3) How would you determine whether a given equilibrium point (not necessarily the coexistence equilibrium) will exhibit the following dynamics after a pulse perturbation?

a) locally stable,

b) locally unstable (including attractor-repeller dynamics),

c) or neutrally stable