Math 2080: Differential Equations
Worksheet 8.2: Linearization and steady-state analysis

NAME:

1. Consider the following model: $\begin{cases} X' = X(1-X) - XY \\ Y' = Y(\frac{4}{5} - \frac{3}{5}Y) - XY. \end{cases}$

   (a) Describe what this system could model.

   (b) Find the isoclines and sketch them on the XY-plane.

   (c) Find all steady-state solutions.

(d) Linearize the system at each steady-state solution (X^*, Y^*) and determine the behavior of the system when $X \approx X^*$ and $Y \approx Y^*$.