For each of your group’s systems on the Lotka-Volterra Systems worksheet, 

1. Find the $x$- and $y$-nullclines and all equilibrium points for the system. (These should match what you found on the Lotka-Volterra worksheet!) Draw them in the plane.

2. Draw appropriate up, down left, and right directions vectors along the nullclines.

3. Looking only in the first quadrant, identify the regions created by the nullclines.

4. Analyze the behavior of solutions that start in the different regions.

You’ll use your answers to finish Lab 2.

- For Group 1

A. \[
\frac{dx}{dt} = -5x + 2xy \\
\frac{dy}{dt} = -4y + 3xy
\]

B. \[
\frac{dx}{dt} = 6x - x^2 - 4xy \\
\frac{dy}{dt} = 5y - 2xy - 2y^2
\]

- For Group 2

A. \[
\frac{dx}{dt} = -3x + 2xy \\
\frac{dy}{dt} = -5y + 3xy
\]

B. \[
\frac{dx}{dt} = 5x - x^2 - 3xy \\
\frac{dy}{dt} = 8y - 3xy - 3y^2
\]

- For Group 3

A. \[
\frac{dx}{dt} = -4x + 3xy \\
\frac{dy}{dt} = -3y + 2xy
\]

B. \[
\frac{dx}{dt} = 5x - 2x^2 - 4xy \\
\frac{dy}{dt} = 7y - 4xy - 3y^2
\]

- For Group 4

A. \[
\frac{dx}{dt} = -5x + 3xy \\
\frac{dy}{dt} = -3y + 2xy
\]

B. \[
\frac{dx}{dt} = 9x - 2x^2 - 4xy \\
\frac{dy}{dt} = 8y - 5xy - 3y^2
\]