

Instructions: Show all work. Use exact answers unless otherwise asked to round.

1. A system of differential equations is given by $\begin{cases} \frac{dx}{dt} = -0.9x + 0.6x^2 - xy \\ \frac{dy}{dt} = 0.2y - 0.4y^2 - xy \end{cases}$. Sketch the phase plane using nullclines. Identify all equilibria. Use technology to determine which, if any, of the equilibria are stable. Include both your hand-drawn graph and the technology-based graph. Explain your reasoning for categorizing the equilibria.