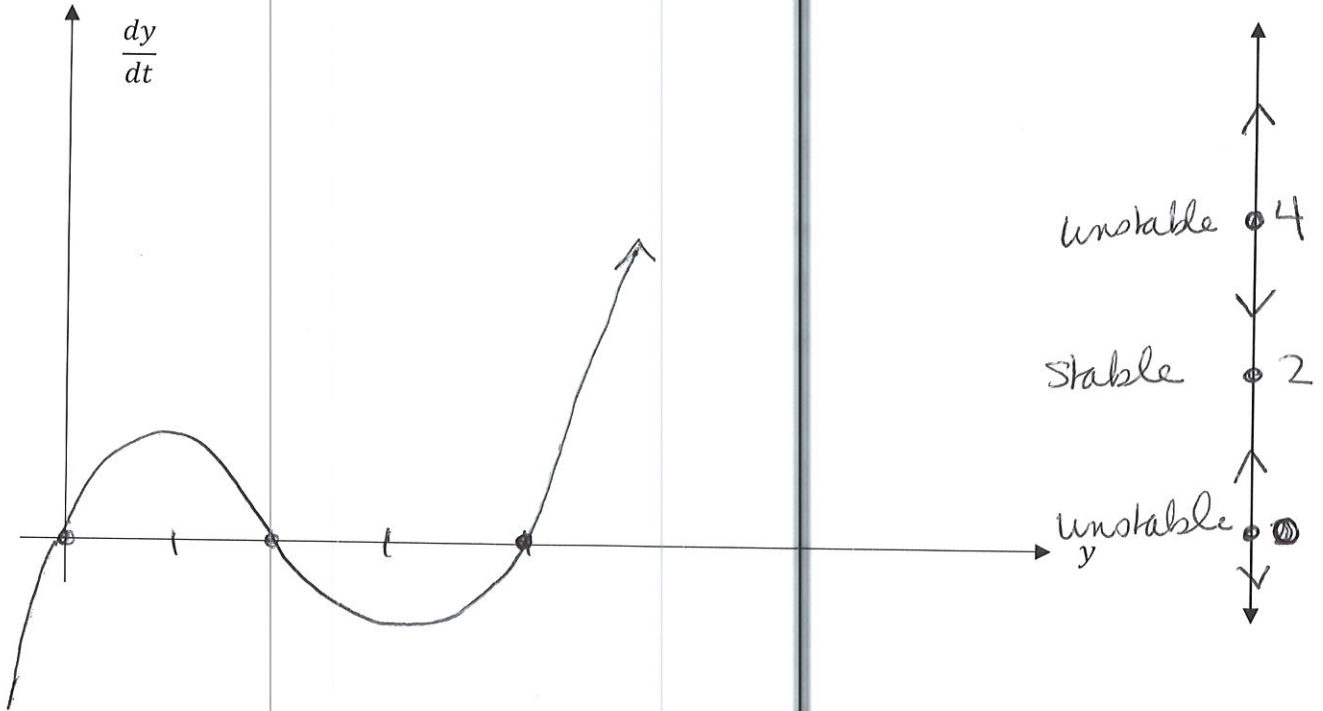


Instructions: Show all work. Use exact answers unless specifically asked to round.

1. Sketch the phase plane of $\frac{dy}{dt} = y(2 - y)(4 - y)$ on the axis below, and then convert that to a phase line.



2. Consider the system of differential equations:

$$\begin{cases} \frac{dx}{dt} = 3x - 5y \\ \frac{dy}{dt} = -4x + 8y \end{cases}$$

Sketch the phase plane by first drawing the nullclines, and then filling in key vectors in each region of the vector field. Is the equilibrium stable, unstable or a saddle point?

$$0 = 3x - 5y$$

$$\frac{3x}{5} = y$$

$$0 = -4x + 8y$$

$$\frac{4x}{8} = \frac{8y}{8} = \frac{1}{2}x$$

