3. [15 points] Consider the equation $y' = ay - y^4$.

a. [5 points] Find all critical points for this equation.

b. [6 points] Draw a phase line for each of the cases $a = -2, 0, 2$. Determine the stability of the critical points in each case.

c. [4 points] Sketch a *bifurcation diagram* that shows the position of the critical points as a function of a in the ay-plane.