HW 5

1. Consider the system

$$\dot{x} = y - 2x$$
$$\dot{y} = \mu + x^2 - y$$

(i) Find and classify the bifurcation(s) that occur as μ varies

(ii) Sketch the phase portrait as a function of μ near the bifurcation(s).

2. Consider the van der Pol oscillator

$$\ddot{x} + \mu(x^2 - 1)\dot{x} + x = a$$

Find the curves in (μ, a) at which Hopf bifurcations occur.