HW 8

1. Determine the stability of equilibria or lack thereof for

   (a) $x_1' = -x_1 + x_2 + x_1 x_2$ and $x_2' = x_1 - x_2 - x_1^2 - x_2^3$.

   (b) $x_1' = x_2 - x_1^2 + 2$ and $x_2' = 2x_2^2 - 2x_1 x_2$.

2. Prove that in the stable manifold theorem, the stable and unstable manifolds intersect only at the origin locally (that is there is some neighbourhood of the origin where there is no other intersection point). As a consequence, prove that if the unstable manifold is at least 1-dimensional, then the origin is Liapunov unstable.