

Consider the system of ODEs

$$x' = x - y - x^2 + xy$$

$$y' = -x^2 - y.$$

- a) Find all the critical points.
- b) Find the corresponding linear system near each critical point.
- c) Classify their types and whether they are stable or not.
- d) Sketch the phase portrait near each critical points.
- e) Sketch the full phase portrait.