1. Analyse the nonlinear system

\[
\begin{align*}
x' &= x(3-x-y), \\
y' &= y(x-1).
\end{align*}
\]

(a) Find all critical points of the system.

(b) By linearizing the system around each critical point, find the type of each CP (stable/unstable, node/saddle/spiral/center). If you found any saddle points, find their stable/unstable directions (eigenvectors).

(c) Sketch (by hand) the global phase portrait of the system (positive quadrant only).

(d) Use Matlab to plot the direction field and few representative solutions.

2. Perform the same analysis for the system

\[
\begin{align*}
x' &= x(4-x-2y), \\
y' &= y(7-y-3x).
\end{align*}
\]