1. Solve implicitly the DE:

\[ x \frac{dy}{dx} = x \csc \left( \frac{y}{x} \right) + y \]

Hint: Check if this DE is homogenous.
2. Consider the DE
\[
\frac{dy}{dx} = \frac{y(e^y - e)}{e^y},
\]
(a) Find the critical points
(b) Find the phase portrait
(c) Classify each critical point as asymptotically stable, unstable or semi-stable.