1) Plot the direction field for the differential equation
\[ \frac{dy}{dt} = y(y - 1)^2. \] (1)
Find a reasonable window to see what the solutions look like.

2) For the differential equation (1), plot a phase portrait with initial conditions \( y(0) = -0.1, \quad y(0) = 0.5, \quad \text{and} \quad y(0) = 1.1. \) You may need to use different plots for each of the three solutions.

3) For the differential equation (1), and initial condition \( y(0) = 0.5, \) find a numerical solution and give the approximate values of the solution at \( t = 0.5, \quad t = 5, \) and multiples of 10 from \( t = 10 \) to \( t = 50. \) What should the values of \( y \) be approaching and are they in fact approaching this value?

4) Solve the system
\[
\begin{align*}
\frac{dx}{dt} &= y \\
\frac{dy}{dt} &= -2x - 3y
\end{align*}
\]
\[
x(0) = 1 \\
y(0) = 1
\]