Math 2080: Differential Equations
Worksheet 2.8: The logistic equation

NAME:

1. The population of a certain island is believed to be growing according to the logistic equation. The maximum population the planet can hold is 10^7. In year zero the population is 50% of this maximum, and the rate of increase of the population is 10^6 per year.

   (a) What is the logistic equation satisfied by the population, $y(t)$?

   (b) How many years until the population reaches 90% of the maximum?

   (c) Sketch this solution curve in the ty-plane, as well as the steady-state solutions $y(t) = 0$ and $y(t) = 10^7$.

2. Sketch the steady-state solution curves to the differential equation $y' = y(y-1)(y-5)$, and several other curves. Is this an example of the threshold equation? Why or why not?