Here the independent variable is $t$.

For the differential equation $y' = y(1 - y)$:

1. Identify the equilibrium solutions.

2. Sketch the direction field, and representative solution curves. In particular, make sure your sketch includes the curves through $(0,-1)$, $(0,1/2)$, and $(0,2)$.

3. Based on your work on Question 2, tell me what happens to the solution of the initial value problem $y' = y(1 - y)$, $y(0) = y_0$ as the independent variable $t$ goes to $+\infty$.

4. Based on your work in Questions 2 and 3, tell me which equilibrium solutions are stable and which are unstable. Explain your answer.

5. The inflection points of the solution curves lie on a single horizontal line: which line, and why?

6. Find an explicit solution to the initial value problem $y' = y(1 - y)$, $y(0) = y_0$, and use your solution to check your answer to Question 3.

7. Comment on which method provides the simplest answer to Question 5: analyzing the direction field or finding an explicit solution.