Math 322 Practice for Wednesday, Week 1

These are practice problems. They will not be collected, but solutions will be posted. In the following $y = y(t)$.

1. Solve the differential equation $y' = ty^2$ with the initial condition $y(0) = 3$.

2. Solve the differential equation $y' = 4te^{-y}$ with initial condition $y(0) = -1$.

3. Consider the differential equation $y' = r(S - y)$ where r and S are positive constants. In the lecture notes for Monday, Week 1, we found that if we assume $y < S$, the solution is
$$y = S - (S - I)e^{-rt},$$
where $I = y(0)$.

   (a) What is the solution if we assume $y > S$? (Express you solution as close to the solution for the $y < S$ case as you can.)

   (b) What is the solution if $y = S$?