Dartmouth College
Mathematics 23 - Assignment 3

1. (Lebl 1.4.5) Find all solutions of $y' + 6y = e^x$ (where $y = y(x)$.)
2. (Lebl 1.4.7) Consider $y' + \cos(x)y = \cos(x)$.
   (a) Use an integrating factor to solve this differential equation.
   (b) Use separation of variables to solve the same differential equation.
3. Boyce and DiPrima: Section 2.1: 3
4. Boyce and DiPrima: Section 2.1: 16
5. Solve $t^2y' + y^2 = 0$.
6. Verify that the function $y(t) = t^{3/2} + 1$ is a solution to the initial value problem.

$$\frac{dy}{dt} = \frac{3}{2}(y-1)^{\frac{1}{3}}; \qquad y(0) = 1$$

What does the uniqueness theorem say about this problem? Can you find another solution?