

Assignment #11

Due on Monday, October 31, 2016

Read Section 4.8, *Linear First Order Differential Equations*, in the class lecture notes at <http://pages.pomona.edu/~ajr04747/>, starting on page 52.

Read Section on *Solutions and Separable Equations* in Section 6.2, pp. 445–462, in *Calculus for the Life Sciences* by Schreiber, Smith and Getz.

Do the following problems

1. Use the method of separation of variables to find all solutions of the differential equation

$$\frac{dy}{dt} = te^y.$$

2. Use separation of variables to find all solutions of the differential equation

$$\frac{dy}{dt} = 3ty - t.$$

3. Find a solution of the differential equation

$$\frac{dy}{dt} = y^2$$

satisfying $y = 1$ when $t = 1$. Give the domain of the definition for the function.

4. Use separation of variables to find a solution of the differential equation

$$\frac{dy}{dt} = \sqrt{y}$$

satisfying $y = 0$ when $t = 0$. Can you come up with another solution of the initial value problem?

5. Solve the initial value problem

$$y \frac{dy}{dt} = t, \quad y(0) = 1.$$