

Assignment #13

Due on Monday, November 7, 2016

Read Section 4.8.4, *Integration by Parts*, in the class lecture notes at <http://pages.pomona.edu/~ajr04747/>, starting on page 58.

Read Section 4.8.5, *Integrating Factors*, in the class lecture notes at <http://pages.pomona.edu/~ajr04747/>, starting on page 59.

Read on *Integration by Parts* in Section 5.6, pp. 394–398, in *Calculus for the Life Sciences* by Schreiber, Smith and Getz.

Do the following problems

1. Use the method of integrating factor discussed in Section 4.8.5 in the class lecture notes to find the general solution of the linear, first order differential equation with constant coefficients

$$\frac{dy}{dt} = ay + b, \quad (1)$$

where a and b are constant with $a \neq 0$.

Compare your result to what you obtain when you solve (1) via separation of variables.

2. Use the method of integrating factor discussed in Section 4.8.5 of the lecture notes to find the general solution of the linear, first order differential equation

$$\frac{dy}{dt} = 2ty + t.$$

3. Find the general solution of the linear, first order differential equation

$$\frac{dy}{dt} = y + e^{2t}.$$

4. Find the general solution of the linear, first order differential equation

$$\frac{dy}{dt} = -\frac{1}{2t}y + t, \quad \text{for } t > 0.$$

5. Solve the initial value problem

$$\frac{dy}{dt} = -\frac{1}{2t}y + t, \quad \text{for } t > 0, \quad y(1) = 0.$$