

Math 285
Fall 2009

Name _____

Homework #7

Due Wednesday, December 2

No late papers accepted! No excuses!

1. Solve the mixing problem depicted in Figure 7.76 on page 587, given that at $t = 0$, the volume of the solution in both tanks is 60 L, and tank 1 contains 60 g of chemical whereas tank 2 contains 200 g of chemical.

2. Determine the inverse Laplace transform of $F(s) = \frac{s+4}{(s-1)(s+2)(s-3)}$

3. Use the Laplace transform to solve the given initial value problem.

$$y'' + 4y = 9 \sin t$$

$$y(0) = 1$$

$$y'(0) = -1$$

4. Solve the given initial value problem using Laplace transforms.

$$y'' + y = 5te^{-3t}$$

$$y(0) = 2$$

$$y'(0) = -2$$

5. Determine two linearly independent power series solutions to the given differential equation centered at $x = 0$. Also determine the radius of convergence and the interval of convergence of the series solutions.

$$y'' - x^2 y' - 3xy = 0$$