APMA 0350 – HOMEWORK 7

Problem 1: (4 points) Find the Laplace transform of

$$f(t) = \begin{cases} t & \text{if } 0 \leq t < 2 \\ 2 & \text{if } 2 \leq t < 5 \\ 7 - t & \text{if } 5 \leq t < 7 \\ 0 & \text{if } t \geq 7 \end{cases}$$

Problem 2: (4 points) Find a function whose Laplace transform is

$$\frac{8}{s^2 - 4s + 4}$$

Problem 3: (4 points) Find a function whose Laplace transform is

$$\frac{(s-1)e^{-3s}}{s^2 - 4s + 5}$$

Problem 4: (8 points) Solve

$$\begin{cases} y'' + 4y = 3\sin(t) - 3u_{2\pi}(t)\sin(t - 2\pi) \\ \quad y(0) = 0 \\ \quad y'(0) = 0 \end{cases}$$