In-class review for Sections 7.2–7.5

1. Find the Laplace transform of the solution $y$ to the initial value problem

$$y'' + 2y' + 2y = \begin{cases} 1 & \text{for } 0 \leq t \leq 7, \\ t & \text{for } t > 7. \end{cases} \quad ; \quad y(0) = 2, \quad y'(0) = 1.$$  

Hint: To compute the Laplace transform of the righthand side, you will have to use the definition, i.e., compute the improper integral.

2. Suppose that

$$\mathcal{L}\{y\} = \frac{2s - 7}{(s^2 - 2s + 5)(s - 1)}.$$  

What is $y$?

More problems on the back...
3] Find a first-order differential equation for the Laplace transform of the solution $y$ to the initial value problem

$$y'' + ty' + 2y = e^{3t}; \quad y(0) = y'(0) = 0.$$ 

**Hint:** let $Y(s)$ denote the Laplace transform of $y$. Your answer will include $Y(s)$ and $Y'(s)$.

4] Suppose that

$$\mathcal{L}\{y\} = \frac{s^2 - s + 1}{s^4 - s^3 + s^2 - s}.$$ 

What is $y$?