

**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  $y$ ?