

A romp through discontinuous forcing functions and 2nd order IVPs with  $\mathcal{L}$ .  
Do *not* turn in!

1. Do page 561, Exercise 2. *Answer to (a):*  $\frac{k}{s^2} e^{-as}$
2. Do page 561, Exercise 13.
3. Do page 575, Exercise 5.
4. Do page page 576, Exercise 29.
5. Do page 577, Exercise 32. *Answer:*

$$y(t) = -\frac{2}{\sqrt{3}} \sin \sqrt{3}t + \frac{1}{22} u_4(t) \left[ \cos(\sqrt{3}(t-4)) - \cos(5(t-4)) \right]$$

6. Answer the following questions about page 577, Exercise 32.
  - (a) Sketch the graph of the forcing function  $u_4(t) \cos(5(t-4))$  here.
  - (b) The solution of the given initial-value is given above. Express that solution in the form of a “multi-part” expression that does not involve any use of the Heaviside function. That is, express it in the form

$$y(t) = \begin{cases} \dots & \text{if } t \dots, \\ \dots & \text{if } t \dots \end{cases}$$