

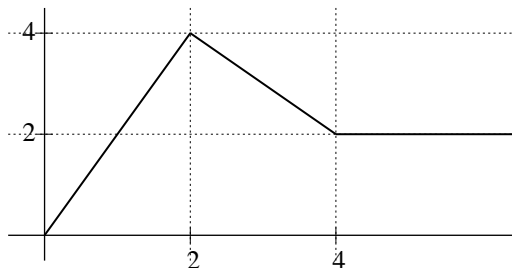
Math 274 HomeworkName: _____
Point Values in boxes.

Sections: 7.6

Due: 30 May 2018

Note: Historically, section 7.6 is difficult for students. If you have not been doing the suggested exercises, now would be a great time to start.

1. 3 A graph of $y = f(x)$ is given below.



Express f as a piecewise defined function and compute its Laplace transform.

2. 3 Applying the Laplace transform to the initial value problem

$$y'' + 4y = \begin{cases} 0, & t < 2 \\ 8e^t, & 2 < t \end{cases}, \quad y(0) = 1, y'(0) = 2$$

gives

$$Y(s) = \frac{s+2}{s^2+4} + \frac{8e^{4-2s}}{(s-2)(s^2+4)}.$$

Determine $y(t) = \mathcal{L}^{-1}\{Y(s)\}$, the solution to the given initial value problem.

3. Consider the initial value problem

$$y'' + y = \begin{cases} 3 \sin 2t, & t < \pi \\ 0, & \pi < t \end{cases}, \quad y(0) = 0, y'(0) = 0$$

(a) 3 Use the method of Laplace transforms to solve the initial value problem.

(b) 1 Express your solution as a simplified (i.e. combine like terms) piecewise defined function.
You may find it useful to know $\sin(\alpha - \beta) = \sin \alpha \cos \beta - \cos \alpha \sin \beta$.