

## Math 2080: Differential Equations

### Worksheet 5.1: What is a Laplace transform?

**NAME:**

The *Laplace transform* of a function  $f(t)$  is the function  $F(s) := \mathcal{L}\{f(t)\}(s) = \int_0^{\infty} f(t)e^{-st} dt$ .

1. Let  $f(t) = \begin{cases} 1, & 3 \leq t \leq 5 \\ 0, & \text{otherwise.} \end{cases}$  Sketch a graph of  $f(t)$  and compute its Laplace transform.

2. Let  $f(t) = \begin{cases} t, & 0 \leq t \leq 3, \\ 3, & t > 3. \end{cases}$  Sketch a graph of  $f(t)$  and compute its Laplace transform.