

## MthSc 208: Differential Equations (Spring 2011)

### In-class Worksheet 5a: Laplace Transforms

**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. Compute the Laplace transform of the function  $f(t) = e^{at}$ . What is the domain of  $F(s)$ ?

2. Let  $f(t) = \begin{cases} 1 & 0 \leq t \leq 1 \\ 0 & t > 1. \end{cases}$  Sketch a graph of  $f(t)$  and compute its Laplace transform.

3. If  $f(t) = t$ , compute  $\mathcal{L}(f)$ .

4. Let  $f(t) = \begin{cases} t & 0 \leq t \leq 1 \\ 1 & t > 1. \end{cases}$  Sketch a graph of  $f(t)$  and compute its Laplace transform.