

MATH 331 – QUIZ 5  
 Professor Richard S. Ellis  
 November 16, 2016

NAME:

The quiz consists of 2 problems. The maximum score is 10 points.

1. (2 POINTS) Let  $f(t)$  be a function of  $t \geq 0$ . Write down the integral that defines the Laplace transform of  $f$ .

$$\int_0^{\infty} e^{-st} f(t) dt$$

2. (8 POINTS) The following table of functions  $f(t)$  and their Laplace transforms is based on the table in the textbook except that there are 8 blank boxes. If the function  $f(t)$  is indicated, then in the blank box to the right of  $f(t)$  give the formula for the Laplace transform. If the Laplace transform is indicated, then in the blank box to the left of the Laplace transform give the formula for the function  $f(t)$  having the indicated Laplace transform. **PUT A CIRCLE AROUND EACH ANSWER.**

In table  
 $a \in \mathbb{R}$ ,  
 $w \in \mathbb{R}$

Some Functions  $f(t)$  and Their Laplace Transforms  $\mathcal{L}\{f\}$

$f(t)$	$\mathcal{L}\{f\}$	$f(t)$	$\mathcal{L}\{f\}$
1	$1/s$	$t^n$ (integer $n \geq 0$ )	$\frac{n!}{s^{n+1}}$
$e^{at}$	$\frac{1}{s-a}$	$\cosh(at)$	$\frac{s}{s^2 - a^2}$
$\cos(wt)$	$\frac{s}{s^2 + w^2}$	$\sinh(at)$	$\frac{a}{s^2 - a^2}$
$\sin(wt)$	$\frac{w}{s^2 + w^2}$	$e^{at} \sin(wt)$	$\frac{w}{(s-a)^2 + w^2}$