NAME.....

MAT 274, summer 2009,
Quiz 9

1. (5 pts) Find the Laplace transform Y of the solution to $y'' + 6y' + 10y = t$ with initial conditions $y(0) = 1,\ y'(0) = 2$.

2. (10 pts) Find the inverse Laplace transform:

$$\frac{s-7}{s^2+6s+10},$$

3. (5 pts) By direct integration, using the definition of the Laplace transform, compute the Laplace transform of $f(t)$ if $f(t) = 1$ when $0 \leq t \leq 1$ and $f(t) = 0$ whenever $t > 1$.

Table 1: **Laplace Transforms**

$f(t)$	$F(s)$
$f'(t)$	$sF(s) - f(0)$
$u_a(t)f(t-a)$	$\mathrm{e}^{-as}F(s)$
$\mathrm{e}^{at}f(t)$	$F(s-a)$
e^{at}	$\frac{1}{s-a}$
t^n	$\frac{n!}{s^{n+1}}$
$\sin(\omega t)$	$\frac{\omega}{s^2+\omega^2}$
$\cos(\omega t)$	$\frac{s}{s^2+\omega^2}$
$e^{at}\sin(\omega t)$	$\frac{\omega}{(s-a)^2+\omega^2}$
$e^{at}\cos(\omega t)$	$\frac{s-a}{(s-a)^2+\omega^2}$
$te^{at}\sin(\omega t)$	$\frac{2\omega(s-a)}{\{(s-a)^2+\omega^2\}^2}$
$te^{at}\cos(\omega t)$	$\frac{(s-a)^2-\omega^2}{\{(s-a)^2+\omega^2\}^2}$
$u_a(t)$	$\frac{e^{-as}}{s}$
$\delta_a(t)$	e^{-as}
$(f*g)(t)$	$F(s)G(s)$