Math 3280 Worksheet 21:

Group members (1 to 3): _____

(1) Find the Laplace transform $\mathcal{L}(x(t)) = X(s)$ of $x(t)$ for the initial value problem $x'' + 2x' + x = t$, $x(0) = 0$, $x'(0) = 1$.

(2) Find the inverse Laplace transform $f(t)$ of $F(s) = \frac{2}{s^3} + \frac{2}{s+1} + \frac{2+s}{s^2+4}$

Function $f(t)$	Transform $F(s)$
1	$\frac{1}{s}$
t	$\frac{1}{s^2}$
t^n	$\frac{n!}{s^{n+1}}$
e^{at}	$\frac{1}{s-a}$
$\cos(kt)$	$\frac{s}{s^2+k^2}$
$\sin(kt)$	$\frac{k}{s^2+k^2}$
$f(t)$	$F(s)$
$f'(t)$	$sF(s) - f(0)$
$f''(t)$	$s^2F(s) - sf(0) - f'(0)$

TABLE 1. Some Laplace transforms