MthSc 208: Differential Equations (Fall 2010)
In-class Worksheet 11: Properties of Laplace Transforms

NAME:

Consider the following properties of the Laplace transform:

(i) $\mathcal{L}\{e^{ct}\, f(t)\}(s) = F(s-c)$

(ii) $\mathcal{L}\{t^n\, f(t)\}(s) = (-1)^n F^{(n)}(s)$

We also know that $\mathcal{L}\{e^{at}\}(s) = \dfrac{1}{s-a}$, and $\mathcal{L}\{t^n\}(s) = \dfrac{n!}{s^{n+1}}$, and $\mathcal{L}\{\cos bt\}(s) = \dfrac{s}{s^2+b^2}$.

1. Compute the Laplace transform of $t^2 e^{3t}$ using Property (i).

2. Compute the Laplace transform of $t^2 e^{3t}$ using Property (ii).

3. Compute the Laplace transform of $e^{2t}\cos 3t$.