MthSc 208: Differential Equations (Summer II, 2010)
In-class Worksheet 5c: Solving ODEs with Laplace Transforms

NAME:

Consider the initial value problem: $y'' - y = e^{2t},\ y(0) = 0,\ y'(0) = 1$. The following facts will be useful to solve this differential equation using Laplace transforms.

(i) $\mathcal{L}\{y''(t)\}(s) = s^2Y(s) - sy(0) - y'(0)$

(ii) $\mathcal{L}\{e^{at}\}(s) = \dfrac{1}{s-a}$

1. Take the Laplace transform of the initial value problem and solve for Y.

2. Use partial fraction decomposition to break up your equation for $Y(s)$.

3. Take the inverse Laplace transform (see (ii)) of each fraction to get the solution to the initial value problem.