

**MthSc 208: Differential Equations (Fall 2011)**  
**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)  $\mathcal{L}\{e^{at}\}(s) = \frac{1}{s - a}$

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.