MthSc 208: Differential Equations (Fall 2011)
In-class Worksheet 5d: Inverse Laplace Transforms

NAME:

Recall the following properties of the Laplace transform:

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

(ii) $\mathcal{L}\{\cos bt\}(s) = \dfrac{s}{s^2+b^2}, \quad \mathcal{L}\{\sin bt\}(s) = \dfrac{b}{s^2+b^2}$

(iii) $\mathcal{L}\{e^{at}\, f(t)\}(s) = F(s-a)$

1. Compute the inverse Laplace transform of $Y(s) = \dfrac{3}{2-6s}$. (Factor, then use (i).)

2. Compute the inverse Laplace transform of $Y(s) = \dfrac{1}{(s-3)(s+1)}$. (Partial fractions, then use (i).)

3. Compute the Laplace transform of $Y(s) = \dfrac{1}{s^2 + 4s + 13}$. (Complete the square, then factor and use (ii) and (iii).)

4. Compute the inverse Laplace transform of $Y(s) = \dfrac{s}{s^2 + 4s + 13}$. (Complete the square, then factor and use (ii) and (iii).)