

## MthSc 208: Differential Equations (Summer I, 2013)

### In-class Worksheet 5d: Inverse Laplace Transforms

**NAME:**

Recall the following properties of the Laplace transform:

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

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

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

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

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

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

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