MTH U345   **Ordinary Differential Equations**   **Fall 2008**

Quiz 5

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1. 12 points Find the Laplace transforms $F(s)$ of the following functions $f(t)$:

(a) $f(t) = \begin{cases} 0, & t < 3 \\ t^2 - 6t + 1, & t \geq 3 \end{cases}$

(b) $f(t) = e^{-4t}\delta_3(t) - e^{2t-2}u_1(t)$

2. 12 points Find the inverse Laplace transform $f(t)$ of the following functions $F(s)$:

(a) $F(s) = \dfrac{4s - 1}{s^2 - 4s + 13}$

(b) $F(s) = \dfrac{4e^{-s}}{s^2 + 6s + 5}$

3. $\boxed{\text{8 points}}$ Consider the initial value problem

$$y'' - 3y' + 2y = 1 + \sin(5t), \quad y(0) = -4, \quad y'(0) = 6$$

Determine the Laplace transform $Y(s)$ of the solution $y(t)$. (**You do NOT have to solve the IVP.**)

4. $\boxed{\text{8 points}}$ Solve the IVP: $\quad y'' = u_3(t), \quad y(0) = 0, \quad y'(0) = 0.$