

MATH 251
Fall 2003
Exam II Laplace Transforms Make-Up

6. (14 pts) Write the following function in terms of unit step functions, and find its Laplace transform.

$$g(t) = \begin{cases} t^2 + 1 & 0 \leq t < 1 \\ e^{-3t} + 1 & 1 \leq t < 2 \\ 1 & t \geq 2 \end{cases}$$

8. (12 pts) Find the inverse Laplace transform of:

$$F(s) = \frac{s^2 - 4}{s^3 + 6s^2 + 9s}$$

9. (20 pts) Solve the following initial value problem:

$$y'' + 4y' + 8y = e^{2t} - 2\delta(t - 2\pi), \quad y(0) = 2, \quad y'(0) = 0$$