MATH 333 – Section 002 – Quiz 8

You may work with other class members on this quiz, but you may not receive assistance from people not in MATH 333 (Section 002). You must show all of your work to receive full credit. Do all your work on other sheets of paper and be sure to staple all the pieces of paper together or YOU WILL GET A ‘ZERO’ ON THE QUIZ. Do not use decimal approximations unless asked to do so. Your work on this quiz must be handed in by Friday, 3 November 2006 at 1040. GOOD LUCK!

1) Using the table distributed in class, find the Laplace transform of the function

\[ f(t) = t^2 \sin^2 t. \]

2) Using the table distributed in class, find the inverse Laplace transform of the function

\[ F(s) = \frac{3s - 5}{2s^2 - 12s + 26}. \]

3) Using the Laplace transform technique, solve the initial value problem

\[
\begin{cases}
  y'' - 6y' + 9y = u_2(t) \\
  y(0) = 2 \\
  y'(0) = -1.
\end{cases}
\]

Since \( u_2(t) \) has a discontinuity, so must the left side of the differential equation in (1). Clearly demonstrate this balance of the discontinuities. Feel free to use Maple to assist you. If you do use Maple, be sure to include a hard copy of your Maple work.