Homework Problem 12
Due date: Wednesday 20 April 2011
(20 points) Apply the Lax-Wendroff method to the problem
\begin{align}
  u_t + (2 + \sin(u)) u_x &= 0 \quad (1) \\
  u(0, t) &= 3 + \sin(5t) \quad (2) \\
  u(x, 0) &= 3 + \exp(-50(x - 4)^2) \quad (3)
\end{align}
for \( x \in (0, 10) \) and \( 0 \leq t \leq 4 \). Use the condition \( u_{xx} = 0 \) for the right boundary. Use \( dx = 1d - 3 \) and \( dt = 1d - 5 \). Create a plot showing the initial condition and solution at the 20%, 40%, 60%, 80% and 100% marks. Use the format from SAMPLE2.f at the beginning of the semester, letting \( np = (M-1)/5 \), where \( M \) is the total number of time steps.