Math 712, **Homework Set 3**, September 20, 2005
Due Wednesday, September 28

SOME INSTRUCTIONS: The file **progs.tar** on the HW website is a tar archive. First, save the file to disk. Then, in the directory where you saved the file, do the following on the command line:

tar xvf progs.tar

A new subdirectory is created in the directory where you placed the file progs.tar; in that subdirectory you will find some useful stuff described in the **README** file.

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1. Do Exercise 1.3.1 from the texbook. Use the example programs supplied thus far as a basis for your own programs. **NOTE**: The boundary condition at $x = -1$ is homogeneous Dirichlet, while at the boundary $x = 3$ we cannot impose a boundary condition (the characteristic is outgoing at that boundary) hence for schemes (b), (c), and (d), you need to impose the numerical boundary condition given in the problem statement. When you graph the computed solution at the final time for the "useful cases" also graph the exact solution of the problem. In that way you should be able to see how the approximation approaches the exact solution as h is decreased for the "useful cases."

2. Do Exercise 1.3.4 from the textbook. At $x = 3$ use the same boundary condition as in case (d) in the above problem.

3. Do Exercises 1.4.2 and 1.4.4 from the texbook.