

CPS 5310 Spring 2015
Shirley Moore, Instructor
April 16th Class

Name _____

Finite Difference Methods for PDES

1. Derive the forward difference in time/central difference in space (FTCS) finite difference formulation for the 1D time-dependent heat equation. This formulation yields an explicit time-stepping method. Show how you would proceed using the initial and boundary conditions given in class.

2. Derive the backward difference in time/central difference in space (BTCS) finite difference formulation for the 1D time-dependent heat equation. This formulation yields an implicit method. Show how you would proceed using the initial and boundary conditions given in class.

3. Derive the central difference in space finite difference formulation for the 2D time-independent heat equation and set up the system of linear equations using the boundary conditions given in class.