Review for Exam 2 (PDE)

Please review all the material below. In addition, please review homework and examples from the notes.

1. Section 1.9. Classification of PDE's as elliptic, hyperbolic, and parabolic. Changing variables in PDE's. Converting second order PDE's with constant coefficients into a canonical form.
2. Section 2.1. Heat kernel solution of the Cauchy problem for the heat equation.
3. Section 2.2. Derivation of D'Alembert's formula for solution of the Cauchy problem for the wave equation. Characteristics. Region of influence and domain of dependence.
4. Section 2.3. Definition of a well-posed problem. Examples of well-posed and ill-posed problems.
5. Section 2.4. Solving heat and wave equations on a half-line by the method of even/odd extensions.
6. Section 2.5. Solving heat and wave equation with sources. Finding particular solutions.
7. Section 2.7. Fourier transform, properties of Fourier transform. Solving PDE's by using Fourier transform. Derivation of the formula for a solution the Cauchy problem for the heat equation.

Good luck!