Math 126 Midterm Review Cheat-Sheet

1 Where PDEs Come From

1.1 What is a partial differential Equation?

1.2 First Order Linear Equation

1.3 Flows Vibrations, and Diffusions

1.4 Initial and Boundary Conditions

1.5 Well-Posed Problems

2 Waves and Diffusions

2.1 The Wave Equation

2.2 Causality and Energy

2.3 The Diffusion Equation

2.4 Diffusion on the Whole Line

3 Reflection and Sources

3.1 Diffusion on the Half-Line

3.2 Reflection of Waves

3.3 Diffusion with a Source

3.4 Waves with a Source

4 Boundary Problems

4.1 Separation of Variables, The Dirichlet Condition

4.2 The Neumann Condition

5 Fourier Series

5.1 The Coefficients

5.2 Even, Odd, Periodic, and Complex Functions

5.3 Orthogonality and General Fourier Series

5.4 Completeness

5.5 Completeness and the Gibbs Phenomenon