

HW #1a

Math 182, Spring 2005

Due Friday, January 28, 2005, at 2:50 p.m.

For each of the following linear second order PDEs, identify in what regions of the two-dimensional plane the equation is elliptic, hyperbolic, or parabolic.

1. $2\frac{\partial^2 u(x,y)}{\partial x^2} + 4\frac{\partial^2 u(x,y)}{\partial y^2} + 4\frac{\partial^2 u(x,y)}{\partial x\partial y} - u(x,y) = 0.$

2. $\frac{\partial^2 u(x,y)}{\partial x^2} + 2y\frac{\partial^2 u(x,y)}{\partial x\partial y} + \frac{\partial^2 u(x,y)}{\partial y^2} + u(x,y) = 0.$

3. $\frac{\partial^2 u(x,y)}{\partial x^2} - \cos(x)\frac{\partial^2 u(x,y)}{\partial x\partial y} + \frac{\partial^2 u(x,y)}{\partial y^2} + \frac{\partial u(x,y)}{\partial y} - \frac{\partial u(x,y)}{\partial x} + 5u(x,y) = 0.$