

**MATH 358: Partial Differential Equations**  
**Problem Sheet 1 and  $\frac{1}{2}$**

**Problem 1.** For the following second order p.d.e.'s, determine the type (parabolic, hyperbolic or elliptic) and then transform into the canonical form.

a)  $u_{xx} + x^2u_{yy} = 0.$

b)  $x^2u_{xx} - 2xyu_{xy} - 3y^2u_{yy} + u_y = 0.$

c)  $u_{xx} + (1 + y^2)^2u_{yy} - 2y(1 + y^2)u_y = 0.$