

Math 3326
Fall Semester 2008
Problem Set #8

1. In each of the following problems (which may be hyperbolic or parabolic), find the general solution and then try to solve the associated Cauchy problem:

(a) $u_{xx} + 2u_{xy} - 3u_{yy} = 0$;

(i) $u(x, y) = 1$ and $u_x(x, y) = x$ on the line $y = 2x + 1$

(ii) $u(x, y) = x$ and $u_y(x, y) = x^2$ on the line $y = 3x$.

(b) $u_{xx} + 4u_{xy} + u_{yy} = 0$;

(i) $u(x, y) = 1$ and $u_x(x, y) = x$ on the line $y = 3x$

(ii) $u(x, y) = 1$ and $u_x(x, y) = x$ on the line $y = 2x$.

(a) $u_{xx} + 6u_{xy} + 9u_{yy} = 0$;

(i) $u(x, y) = 1$ and $u_x(x, y) = 3x$ on the line $y = 3x$

(ii) $u(x, y) = x$ and $u_y(x, y) = x + 1$ on the line $y = x + 1$.