

## HW #8b

### Math 182, Spring 2009

Due Friday, March 27, 2009, by 11:00 a.m.

1. Consider the partial differential equations below and determine the ordinary differential equations implied by the method of separation of variables

(a)  $u_t = ku_{xx} - v_0u_x$

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

(c)  $u_t = \frac{k}{r^2} \frac{\partial}{\partial r} \left( r^2 \frac{\partial u}{\partial r} \right)$

2. Consider the ordinary differential equation

$$\phi'' + \lambda\phi = 0.$$

Determine eigenvalues  $\lambda$  and corresponding eigenfunctions  $\phi$  if  $\phi$  satisfies

(a)  $\phi'(0) = 0, \phi'(L) = 0$

(b)  $\phi'(0) = 0, \phi(L) = 0$

(c)  $\phi(0) = 0, \phi'(L) = 0$