McGill University Math 325A: Differential Equations Assignment 5: due Thursday, November 2, 2000

1. Find the general solution of the differential equation

$$y'' + 4y' + 4y = e^{-2x}\ln(x), \quad (x > 0)$$

2. Given that  $y_1 = \cos(x)/\sqrt{x}$ ,  $y_2 = \sin(x)/\sqrt{x}$  are linearly independent solutions of the differential equation

$$x^{2}y'' + xy' + (x^{2} - 1/4)y = 0, \quad (x > 0),$$

find the general solution of the equation

$$x^{2}y'' + xy' + (x^{2} - 1/4)y = x^{5/2}, \quad (x > 0).$$

3. Find the general solution of the equation

$$x^{2}y'' + 3xy' + y = 1/x\ln(x), \quad (x > 0).$$

4. Find the general solution of the equation

$$(1 - x2)y'' - 2xy' + 2y = 0, \quad (-1 < x < 1)$$

given that y = x is a solution.

5. Find the general solution of the equation

$$xy'' + xy' + y = x, \quad (x > 0).$$