Linear Analysis II Set 7

1. Find one solution to $xy'' + y' + xy = 0$.

2. Write the first three nonzero terms in the two series solutions for these differential equations:

a. $x^2y'' + x(x-3)y' - y = 0$.

b. $3x^2y'' + x(1+3x^2)y' - 2xy = 0$.

c. $3x^2y'' + x(7+3x)y' + (1+6x)y = 0$.

3. Find two linearly independent solutions to $x^2y'' + x(3-2x)y' + (1-2x)y = 0$. One of the solutions could be left in terms of an integral.