ODEs: ASSESSED HOMEWORK I
Please hand it in at the end of our lecture on Monday 1/10/2001

a) Apply the Power-Series Method to find the first four non- zero terms about $x = 0$ of two linearly independent solutions of the following linear ordinary differential equations; also where possible attempt to close the power series.

1) $y'' - 4y = 0.$

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

3) $(1 - x^6)y'' - 6x^5y' + 204x^4y = 0.$

4) $y'' - 4y = 8x$

b) Apply the Method of Frobenius to find the first four non-zero terms of two independent solutions of the following differential equations, valid about some neighborhood of $x = 0$; when possible try to close the series by identifying the correponding functions.

1) $2x^2y'' - 8y = 0.$

2) $x(1 - x)y'' + \frac{1}{2}(x + 1)y' - \frac{1}{2}y = 0.$

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

4) $xy'' - y = 0.$