Test 2

DATE: November 8, 2007
TIME: 60 minutes
COURSE: MATH 2132
EXAMINER: G.I. Moghaddam

NAME:_____

STUDENT # : _____

There are 5 questions of total mark 50.

[12] 1. Use bionomial expansion to find the Maclaurin series of the function $f(x) = \dfrac{1}{\sqrt{2-x}}$. What is the open interval of convergence? Express your answer in sigma notation and simplify as much as possible.

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[8] 2. Choose and answer *only* one the following two parts:

(a) Find the sum of the series $\displaystyle\sum_{n=1}^{\infty} \frac{2^{2n-2}}{n}\, x^{2n}$.

(b) Evaluate the following limit using infinite series.

$$\lim_{x\to 0} \frac{\sqrt[5]{(1-x^2)^3}-1}{x^2}$$

[12] 3. Find, in explicit form, the solution of the differential equation

$$x^2 \frac{dy}{dx} + 3x\, y = 2 \ln x, \qquad y(1) = \tfrac{1}{2}.$$

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[10] 4. Find a 2 -parameter family of solutions of differential equation

$$y'' - 3(y')^2 = 3.$$

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[8] 5. Find a general solution for a homogeneous linear differential equation $\Phi(D)y = 0$ whose auxiliary equation is:

$$(m+1)^2(m-\sqrt{2})^4(m^2+m+1)^3 = 0$$