Term Test 2

DATE: March 6 , 2012
TIME: 70 minutes
COURSE: MATH 2132
EXAMINER: G.I. Moghaddam

NAME:_____

STUDENT # : _____

Q1	Q2	Q3	Q4	Q5	Total (out of 50)

[7] 1. Use the binomial expansion to find **only the third term** of the Taylor series about 1 of $f(x) = 8\sqrt{x} - 18\sqrt[3]{x}$. Simplify your answer.
(You are **not** asked to find all the terms of the Taylor series.)

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[8] 2. Evaluate the following limit using infinite series.

$$\lim_{x\to\infty} x^2 \left[\frac{1}{1-\frac{1}{x}} - e^{\frac{1}{x}} \right]$$

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[9] 3. Find the sum of the series $\displaystyle\sum_{n=0}^{\infty} \frac{1}{n+1}\, x^{3n+1}$.

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[12] 4. Find, in **explicit** form , a 1 -parameter family of solutions for the differential equation

$$2\,y\,\sqrt{x}\,\frac{dy}{dx} \;-\; 3\,x \;-\; e^{\sqrt{x}} \;=\; 2\,\sqrt{x}\,\frac{dy}{dx}\,.$$

Is there any singular solution? Explain.

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[14] 5. Find a 2 -parameter family of solutions for differential equation

$$y'' + \frac{2x}{x^2 - 1}\, y' - 4x = 0\,.$$

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ANSWERS

Q1 $f(x) = (x-1)^2$

Q2 Limit is equal to $\dfrac{1}{2}$

Q3 $S(x) = -\dfrac{\ln|1-x^3|}{x^2}$, $-1 < x < 1$.

Q4 $y = 1 \pm \sqrt{2x\sqrt{x} + 2e^{\sqrt{x}} + 2C}$. There is no singular solution.

Q5 $y = \dfrac{1}{3}x^3 - x + \dfrac{1}{2}C\ln|\dfrac{x-1}{x+1}| + D$.