Dawson College: **Calculus II**: 201-NYB-05-S2: Summer 2008

Name: _____
Student ID: _____

Test 1

This test is graded out of 45 marks. No books, notes, graphing calculators or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Formula:

$\sum_{i=1}^{n} c = cn$ where c is a constant $\quad \sum_{i=1}^{n} i = \frac{n(n+1)}{2}$

$\sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6}$ $\quad \sum_{i=1}^{n} i^3 = \frac{n^2(n+1)^2}{4}$

Question 1. *(3 marks)* Integrate the following indefinite integral:

$$\int \frac{1}{x^{2/7}} + x^{2/7} + \cot x \, dx$$

Question 2. *(5 marks)* Evaluate the definite integral using first principles *(i.e. limit process)*:

$$\int_0^1 x^3 + x \, dx$$

Question 3. *(5 marks)* Integrate the following indefinite integral:

$$\int \frac{e^{2x}}{e^{4x}+1}\,dx$$

Question 4. *(5 marks)* Integrate the following indefinite integral:

$$\int \sqrt{\csc 5x}\csc 5x \cot 5x\,dx$$

Question 5. Given $\int_a^b g(x)\,dx = 1$, $\int_a^c f(x)\,dx = 2$ and $\int_b^c g(x)\,dx = 3$ evaluate the following definite integrals:

1. *(1 mark)*

$$\int_a^c 3f(x)\,dx$$

2. *(3 marks)*

$$\int_c^a f(x) - 2g(x)\,dx$$

Question 6. *(5 marks)* Evaluate the following definite integral:

$$\int_0^{\pi/2} \frac{\sin\frac{x}{2}}{1+\cos\frac{x}{2}}\,dx$$

Question 7. *(3 marks)* Use the Second Fundamental Theorem of Calculus to find $F'(x)$.

$$F(x) = \int_0^{\sin 5x} \frac{1}{\sqrt{1-y^2}}\, dy$$

Question 8. *(5 marks)* Integrate the following indefinite integral:

$$\int \frac{(\ln x)^3}{x}\, dx$$

Question 9. *(5 marks)* Integrate the following indefinite integral:

$$\int \frac{e^{\sqrt[3]{x}}}{\sqrt[3]{x^2}}\,dx$$

Question 10. *(5 marks)* Evaluate the following definite integral:

$$\int_{-3}^{-2} \frac{x^2+x}{2x^3+3x^2+1}\,dx$$

Bonus Question. *(3 marks)*
Integrate the following indefinite intergral:

$$\int \frac{1}{x(\operatorname{arcsec} x)(\ln \operatorname{arcsec} x)\sqrt{x^2-1}}\,dx$$