

**Dawson College**  
**Mathematics Department**  
**Final Examination**  
**201-NYB-05 CALCULUS II**  
Tuesday, December 10, 2013  
Time: 9:30 – 12:30

**Student Name:** \_\_\_\_\_

**Student I.D. #:** \_\_\_\_\_

**Teacher:** \_\_\_\_\_

**Instructors:** K. Ameer, M Chaubey, A. Hariton

**Instructions**

- Print your name and student ID number in the space provided above.
- Attempt all questions.
- All questions are to be answered directly on the examination paper.
- Translation and regular dictionaries are permitted.
- Small, noiseless, NON-PROGRAMMABLE calculators without text storage or graphics capability are permitted.
- This examination consists of 11 questions.
- **Please ensure that you have a complete examination before starting**

Question	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
Total /100	

**This exam must be returned intact.**

1. [5] Evaluate the following indefinite integrals

a.  $\int \frac{x}{\sqrt{x}} dx$

b. [5] !  $\frac{dx}{\sqrt{1 + \sqrt{x}}}$

c. [5]  $\tan^3(4) \sec^3(4)$

d. [5]  $\int \frac{dx}{x\sqrt{x} - 1}$

e. [5]  $\frac{\sin^3(2x)}{\cos^4(2x)} dx$

f. [5]  $\int \frac{x+1}{(x-1)(x^2+1)} dx$

2. [5] Find the area of the region bounded by the curves  $y = x^4$  and  $y = 8x$



3. [10

4. [5] Find the arch length of the curve given by:

$$x = y - \frac{1}{y}$$

5. [5] Find the average value of  $f(x) = \frac{1}{2}x^2 + 1$  on the interval  $[0, \frac{\pi}{2}]$ .

6. [5

7. Determine whether each improper integral converges or diverges. If it converges, find its value.

a. [4]  $\int_2^3 \frac{dx}{(x-2)^{1/3}}$

8. [8] Find the sum of the series  $\sum_{n=0}^{\infty} \left( \frac{3}{4} \right)^n - \frac{2}{3}$ , {

9. Determine whether each series converges absolutely, converges conditionally, or diverges. State any tests used to reach your conclusions

a. [4]  $\sum_{n=1}^{\infty} \frac{(-1)^n + (-1)^{n+1}}{n^2}$

b. [4]  $\frac{\quad}{1 \quad 2}$



c. [4]  $\sum_0^{\infty} (-1)^n \left( \frac{5^{2n+7}}{7^{2n+10}} \right)$

d. [4]  $\sum_0^5 (-1)^k \frac{5}{(k-1)!}$

$$\text{e. [4]} \quad \frac{\sqrt{n}}{5n^3} \quad n$$

10. [4] Find the Maclaurin series representation of  $e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$

[4] Find the radius and interval of convergence of the power series. Test for the end points also.

$$\sum_{n=0}^{\infty} \frac{(-1)^n}{n!} x^n$$