



Prince Sultan University
Department of Mathematical Sciences

Major III Exam

Semester II, 2007 SPRING (062)

19th May, 2007

MATH 113 – CALCULUS II

Score
15

Time Allowed : 90 minutes

Maximum Points : 100 points

Mr. Khaled Naseralla

Name of the student : _____

ID number : _____

Section : _____

For All The Students:

- Answer all the questions.
- This exam consists of **5 questions and a total of 7 pages.**
- Show your working for each question with all the key steps.
- Only scientific, non-programmable calculators are allowed.

Questions	Maximum Score	Your Score
Q.1	60	
Q.2	10	
Q.3	20	
Q.4	5	
Q.5	5	
Total	100	

Q.1 : Evaluate the following integrals:

(6 points each)

a) $\int \frac{dx}{\sqrt{1-4x^2}}$

b) $\int \frac{dx}{x^2+4x+8}$

c) $\int \frac{xdx}{4+x^4}$

d) $\int \frac{\cos^3}{\sqrt{\sin x}} dx$

e) $\int_0^{\frac{\pi}{4}} \cos x \cos 5x dx$

f) $\int x \tan^3(x^2) \sec^4(x^2) dx$

g) $\int \tan^5(x) \cos^8(x) dx$

h) $\int_0^{\frac{\pi}{2}} x \sin(4x) dx$

i) $\int \frac{x^5}{\sqrt{1-x^3}} dx$

j) $\int_{\sqrt{2}}^2 \frac{dx}{x^2 \sqrt{x^2 - 1}}$

Q.2: Evaluate the integral $\int \frac{x}{(16 - x^2)^2} dx$ using two different methods.

(10 points)

Q.3: Evaluate the given limits.

(5 points each)

a) $\lim_{x \rightarrow \infty} x (e^{\frac{1}{x}} - 1)$

b) $\lim_{x \rightarrow 0} \frac{x - \sin x}{x - \tan x}$

c) $\lim_{x \rightarrow 0} \left(\frac{1}{e^x - 1} - \frac{1}{x} \right)$

d) $\lim_{x \rightarrow 0} (1 + 2x)^{\frac{1}{x}}$

Q.4: Find $\frac{dy}{dx}$ for $y = \sinh^2(1 - x^2)$ (5 points)

Q.5: Rewrite the following expression as a ratio of polynomials (in terms of x) (5 points)

$\sinh(\ln x^2)$