Prince Sultan University

Deanship of Educational Services

Department of Mathematics and General Sciences

COURSE DETAILS:

Calculus II	MATH 113	Final Exam
Semester:	Spring Semester --Term 191	
Date:	Dec. 14, 2019	
Time Allowed:	3 hours	

STUDENT DETAILS:

Student Name:			
Student ID Number:			
Section #:		Attendance Serial #:	
Instructor's Name:			

INSTRUCTIONS:

- You may use a scientific calculator that does not have programming or graphing capabilities. NO borrowing calculators.
- NO talking or looking around during the examination.
- NO mobile phones. If your mobile is seen or heard, your exam will be taken immediately.
- Show all your work and be organized.
- You may use the back of the pages for extra space, but be sure to indicate that on the page with the problem.

GRADING:

	Page 2 Q#1,Q#2	Page 3 Q#3,Q#4	Page 4 Q#5	Page 5 Q#6	Page 6 Q#7	Page 7 Q#8,Q#9	Total	Total
Questions								
Marks	**16**	**14**	**12**	**10**	**14**	**14**	**80**	**40**

Q1. [**3+3+5 Marks**] Evaluate the following integrals:

1. $\int (e^x + 2)^2 \, dx$

2. $\int x(x-1)^{100} dx$

3. $\int x \, sinx \, cosx \, dx$

Q2. [**5 Marks**] Find the area of the region bounded by the curves $y = x^4$ and $y = 16$

Q3. [**5 Marks each**] 1. Write the partial fractional decomposition form for

$$\boldsymbol{f(x) = \frac{-3x^2+11x-33}{(x^2+9)(x+4)}}$$

2. Evaluate $\int f(x)\, dx$

Q.4 [**4 Marks**] Test the convergence of the series: $\sum_{n=1}^{+\infty} \frac{3n^3+n+1}{7n^3-2n^2+8}$

Q5. **[6 Marks each]** Test the following series for convergence. Then find the sum of the convergence one [Justify your answer]:

1. $\sum_{n=1}^{+\infty} \frac{2^{2n-1}}{4^{2n+1}}$

2. $\sum_{n=2}^{+\infty} \left(\sqrt[n+1]{4} - \sqrt[n]{4} \right)$

Q.6 **[10 Marks]** Find interval of convergence **and** the radius of convergence of the series:

$\sum_{n=2}^{+\infty} \frac{(x+2)^n}{2^n \ln(n)}$

Q.7 [**7 Marks each**] Test the convergence of the following series:

1. $\sum_{n=1}^{+\infty}\left(1-\frac{2}{n}\right)^{-n^2}$

2. $\sum_{n=1}^{+\infty}(-1)^n(\ln(n+1)-\ln(n))$

Q.8 [**8 Marks**] Evaluate the following integral: $\int \frac{\sqrt{x^2-9}}{x^2} dx$

Q.9 [**6 Marks**] Evaluate $\int_{-4}^{4} (x^3\sqrt{x^2 + cosx} + \sqrt{16 - x^2})dx$