Prince Sultan University

Deanship of Educational Services
Department of Mathematics
and General Sciences

COURSE DETAILS:

Calculus II	MATH 113	FINAL EXAM
Semester:	Fall Semester -- Term 181	
Date:	Saturday December 15th, 2018	
Time Allowed:	3 hours	

STUDENT DETAILS:

Student Name:	
Student ID Number:	
Section:	
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	Page 3	Page 4	Page 5	Total
Questions	**#1**	**#2, #3**	**#4, #5**	**#6**	
Marks	**11**	**13**	**10**	**6**	**40**

Q#1 [3+4+4 Marks Each] Evaluate the following integrals:

1. $\int \frac{x^4 + x^2}{x^3}\, dx$

The Solution:

2. $\int x\sqrt{x+1}\, dx$

The Solution:

3. $\int \tan^4 x \sec^4 x\, dx$

The Solution:

Q#2 [4 Marks] Evaluate the integral $\int \frac{x}{x^4+1}\ dx$

The Solution:

Q#3 [3+3+3 Marks each] Test the following series for convergence [Justify your answer]:

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

The Solution:

2. $\sum_{n=1}^{+\infty} \sqrt[n]{3} - \sqrt[n]{2}$

The Solution:

3. $\sum_{n=1}^{+\infty} \frac{3^n}{4^n}$

The Solution:

Q#4. [4 Marks] Evaluate the integral $\int \frac{1}{x^2-x}\, dx$

The Solution:

Q#5. [4+2 Marks] Let Ω denoted to the region bounded by the curves $y = x^2, x = 2$ and $y = 0$.

1. Find the volume of the solid that is generated by revolving Ω about the *x*-axis. [Using disc/washers Method]

The Solution:

2. **Set up** the integral representing the area of surface generated by revolving Ω about the *x*-axis.

The Solution:

Q#6 [6 Marks] Find the interval and radius of convergence of the series: $\sum_{n=1}^{+\infty} \frac{(x-2)^n}{n}$

The solution: