Prince Sultan University

Deanship of Educational Services

Department of Mathematics
and General Sciences

COURSE DETAILS:

Calculus II	MATH 113	MAJOR EXAM I
Semester:	Spring Semester --Term 191	
Date:	Monday, October 7, 2019	
Time Allowed:	75 minutes	

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 1	Page 2	Page 3	Page 4	Total	Total
Questions						
Marks	**9**	**10**	**9**	**13**	**40**	**20**

Q1. [3 Marks] Find the derivative of $f(x) = \int_{x^2}^{e^{3x}} \ln(t+2)\,dt$

Q2. [6 Marks] Using the **Definition of the definite integral** (use the right end points) to evaluate $\int_0^1 (x^2 + 2)\,dx$

Q3. [10 Marks (2+2+3+3)] Evaluate the following integrals:

1. $\int \frac{(20+lnx)^2}{x}\, dx$

2. $\int cosx\ secx\ dx$

3. $\int \frac{x^3 + \sqrt[3]{x} - 2}{\sqrt{x}}\, dx$

4. $\int_{\frac{1}{2}}^{\frac{1}{\sqrt{2}}} \frac{4}{\sqrt{1-x^2}}\, dt$

Q4. [6 Marks (3+3)] Evaluate the following integrals:

1. $\int_0^1 x^2 \sqrt{x-1}\, dx$

2. $\int_0^{\frac{\pi}{4}} \frac{1+\cos^2\theta}{\cos^2\theta}\, d\theta$

Q5. [3 Marks] Solve $(x^2-4)\cdot \int_x^{x^2} \sqrt[6]{sin^2 t + t^4 + 1}\, dt = 0$ for x.

Q6. [13 Marks (3+3+3+4)] Let Ω denote to the region bounded by $y = \sqrt{x-4},\ x = 9$ and $y = 0$.

1. Sketch the region Ω.

2. Find the area of the region Ω.

3. Find the volume of the solid that is generated by rotating Ω about the *x*-axis. (Using dick/Washers Method)

4. Find the volume of the solid that is generated by rotating Ω about the *y*-axis. (Using cylindrical shells method)