# Prince Sultan University

**Math 113-Major Exam 1-Term 181**

**Time Allowed: 75 minutes**

Student Name:_____ _____ _____

Student ID #: _____

Serial Class #:_____ Section #:

Instructor's Name:

***Important Instructions:***

1. You may NOT use notes or any textbook.
2. Talking during the examination is NOT allowed.
3. Your exam will be taken immediately if your mobile phone is seen or heard.
4. Looking around or making an attempt to cheat will result in your exam being cancelled.
5. This examination has **5** problems. Make sure your paper has all these problems.

| Problems | Max points | Student's Points |
|---|---|---|
| Q#1 | 6 | |
| Q#2 | 14 | |
| Q#3,4 | 10 | |
| Q#5 | 10 | |
| Total | 40 | |

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

Q# 2 [4+3+4+3 Marks] Evaluate the following integrals:

1. $\int \frac{\ln x}{x} dx$

2. $\int \cot x \cdot \tan x \, dx$

3. $\int_0^4 |x^2 - 9| dx$

4. $\int \frac{2x^2 + \sqrt[3]{x} + 1}{x} dx$

Q#3 [4 Marks] Evaluate $\int_0^1 \sqrt{x^2 + x^3}dx$. First factor integrand.

Q#4 [3+3] Let $y = (x - 3) \cdot \int_x^{x^2} \sqrt[4]{1 + t^4}dt$. Find

1. $\frac{dy}{dx}$

2. Solve the equation $y = 0$

Q#5 [2+4+4 Marks] Let Ω denote to the region bounded by $y = x^2 + 1,\ x = 1,\ x = 2$ and $y = 5$.

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 *y*-axis. (Using disc/washers method)