#### Notre Dame University

### Faculty of Natural and Applied Sciences

**Department of Mathematics and Statistics**

MAT 213

Calculus III

**Exam 1**

**Tuesday, April 9th, 2013**

### Duration: 60 minutes

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |  |  |
| --- | --- | --- |
| **Problem**  **Number** | **Points** | **Score** |
| **1** | **29** |  |
| **2** | **24** |  |
| **3** | **11** |  |
| **4** | **14** |  |
| **5** | **22** |  |
| **Total** | **100** |  |

##### Section: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Instructor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Grade: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Directions:**

1. **Write neatly and clearly.**
2. **Show all your work.**
3. **Calculators are NOT allowed.**
4. **Mobiles should be turned off and unseen.**

# Please note that you have 5 problems and 6 pages.

**1) (29 pts)** Evaluate the following integrals:

1. **(10 pts)**

**b) (7 pts)** **

**c) (12 pts)**

**2) (24 pts)** Evaluate the following improper integrals:

**a) (10 pts)** *dx*

**b)** **(14 pts)** **i)** **(10 pts)** Calculate 

**ii) (4 pts)** Use part (i) to evaluate the improper integral 

**3) (11 pts) a) (6 pts)** Establish the following reduction formula:

, for

**b) (5 pts)** Use part a) above to evaluate:.

**4) (14 pts)** Test the following improper integrals for convergence or divergence:

**a) (7 pts)**  *dx*

**b) (7 pts)** 

**5) (22 pts)** Determine if the following sequences are convergent or divergent. Justify your answer and find the limit of every convergent sequence.

**a) (6 pts)**

**b) (6 pts)**

**c) (10 pts)**