Math 221 **Name (Print):** _____
Summer 2016
Final
7/29/16
Time Limit: 75 Minutes Teaching Assistant _____

During this exam you may *not* use your books, notes, or any calculator.

You are required to show your work on each problem on this exam. The following rules apply:

- **If you use a theorem you must indicate this and explain** why the theorem may be applied.
- **Organize your work**, in a reasonably neat and coherent way, in the space provided.
- If you need more space, use the back of the pages; clearly indicate when you have done this.

Do not write in the table to the right.

Problem	Points	Score
1	20	
2	20	
3	20	
4	20	
5	20	
6	20	
7	20	
8	20	
9	20	
Total:	180	

1. (20 points) Compute the following integral.

$$\int_0^1 xe^x dx$$

2. (20 points) Compute the following integral.

$$\int \frac{x^5}{\sqrt{1+x^2}} dx$$

3. (20 points) Compute the following integral.

$$\int \frac{x^2 + x}{x - 2} dx$$

4. (20 points) Compute the following integral if it exists.

$$\int_1^2 xln(x^2-1)dx$$

5. (20 points) Determine if the following series converges or diverges.

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

6. (20 points) Determine if the following series converges or diverges.

$$\sum_{n=1}^{\infty} \frac{1}{e^n - lnn}$$

7. (20 points) Determine if the following series converges or diverges.

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

8. (20 points) Find the Taylor Series Expansion for the following function centered at c=5.

$$f(x) = \frac{x^2}{9+3x}$$

9. (20 points) Express the following equation in terms of rectangular coordinates. r=sint.