MATH 1B **Name (Print):** _____
Summer 2019
Exam 3
8/2/19 SID: _____

This exam contains 7 pages (including this cover page) and 6 problems. Check to see if any pages are missing. Enter all requested information on the top of this page, and put your initials on the top of every page, in case the pages become separated.

You may *not* use your books, notes, or any calculator on this exam.

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

- **If you use a theorem or test you must clearly indicate this.**
- **Organize your work**, in a reasonably neat and coherent way, in the space provided. Work scattered all over the page without a clear ordering will receive very little credit.
- **Mysterious or unsupported answers will not receive full credit**. A correct answer, unsupported by calculations, explanation, or algebraic work will receive no credit; an incorrect answer supported by substantially correct calculations and explanations might still receive partial credit.

Do not write in the table to the right.

Problem	Points	Score
1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
Total:	60	

1. (10 points) Determine whether the following series converges absolutely, converges conditionally or diverges.

$$\sum_{n=1}^{\infty}(-1)^n \frac{n^2 \cdot n!}{(n+3)!}$$

2. (10 points) Determine whether the following series converges absolutely, converges conditionally or diverges.

$$\sum_{n=1}^{\infty} \left(\frac{n - n^2}{2^n} \right)^{2n}$$

3. (10 points) Determine the radius and interval of convergence of the following power series,

$$\sum_{n=0}^{\infty} \frac{2^n}{n}(x-1)^n$$

4. (10 points) Determine the Taylor series for the following function centered at $x = 0$

$$f(x) = \frac{x^2}{1 + x^2}$$

5. (10 points) Determine the Taylor series for the following function centered at $x = 2$

$$f(x) = \frac{1}{3 - x}$$

6. (10 points) Determine the Taylor series for the following function centered at $x = 0$

$$f(x) = \int \sin x^3 \, dx, \quad f(0) = 0$$