

Your Name

Your Signature

Student ID #

--	--	--	--	--	--	--

	Wendy		Keir	
Section	1:30	2:30	1:30	2:30
(circle one)	CA	CB	CC	CD

Problem	Total Points	Score
1	12	
2	10	
3	8	
4	8	
5	12	
Total	50	

- This exam is closed book. You may use one $8\frac{1}{2} \times 11$ sheet of notes.
- Calculators are not allowed.
- Do not share notes.
- In order to receive credit, you must show your work. Explain why your answers are correct.
- Place a box around **YOUR FINAL ANSWER** to each question.
- If you need more room, use the backs of the pages and indicate to the reader that you have done so.
- Raise your hand if you have a question.

1 (12 points) Determine whether the series is convergent. Justify your answers.

(a) (6 points)
$$\sum_{n=2}^{\infty} (-1)^n \frac{\sqrt{n}}{\ln n}$$

(b) (6 points)
$$\sum_{n=1}^{\infty} (-1)^{n+1} \frac{\sqrt{n}}{n+5}$$

2 (10 points) Determine whether the statement is true or false. There is no partial credit on this problem.

(a) (2 points) If $\lim_{n \rightarrow \infty} b_n = 0$ then $\sum_{n=1}^{\infty} b_n$ converges.

(b) (2 points) $\sum_{n=0}^{\infty} \frac{(-1)^n}{(2n+1)} 3^{(2n+1)/2} = \pi/3$

(c) (2 points) If $c_n > 0$ and $\sum_{n=1}^{\infty} c_n$ converges, then $\sum_{n=1}^{\infty} (-1)^{n-1} c_n$ converges.

(d) (2 points) If $\sum_{n=1}^{\infty} c_n (-4)^n$ converges, then $\sum_{n=1}^{\infty} c_n 4^n$ also converges.

(e) (2 points) $\sum_{n=0}^{\infty} \frac{(-3)^{n+1}}{2^{2n}} = 12/7$.

- 3 (8 points) Find the interval of convergence of the power series $\sum_{n=0}^{\infty} \frac{(-1)^n \sqrt{2n+1}}{3^n} (x-5)^n$.
Do not check the endpoints.

- 4 (8 points) Compute the 3rd-degree Taylor polynomial of $f(x) = 2 - x - 2x^2 + x^3$ centered at $a = 1$.

5 (12 points) Use infinite series to estimate the definite integral $\int_0^1 \cos(x^2) dx$ with error less than 0.01. Give your answer as a fraction.