

Final Exam: Some problems for review

The exam will be held from **8 AM - 10:50 AM on Wednesday, April 16, 2025** in the regular classroom (SCB 303). You will do it on WebAssign. The exam is protected by a passcode which will be given to you at the time of the exam. You will bring your own laptop and pocket calculator (of any kind). You are not allowed to use any app on your laptop, even the calculator app. Your web browser must occupy the full screen at all time. Phones and notecards are not allowed. The instructor will provide scratched papers for you.

For multiple-choice questions that have 4 choices, you will have two attempts. For multiple choice questions that have fewer than 4 choices, you can only have one attempt. All questions will be automatically graded, so you will see your score when you finish your exam or when the time is up. The material covered is Sections 11.1-11.9. There will be some optional questions for extra credit. These questions may be on any topic taught in the course (Chapters 7-11).

You should review the homework problems, worksheets, quizzes, examples given in the lectures. It is always a good idea to study for the exam with someone. Additional problems to practice:

- 1) Find $\lim_{n \rightarrow \infty} \frac{n}{2n + \sqrt{n+1}}$ and $\sum_{n=1}^{\infty} \frac{n}{2n + \sqrt{n+1}}$.
- 2) Compute the series $\sum_{n=1}^{\infty} \frac{(-1)^n}{n^4 + n}$ correct to 3 decimal places.
- 3) Use any test to determine whether the series is absolutely convergent, conditionally convergent, or divergent.

(a) $\sum \frac{n}{n^3 + 1}$

(b) $\sum \frac{1}{n\sqrt{\ln n}}$

(c) $\sum \frac{(-5)^{2n}}{n^2 9^n}$

(d) $\sum (-1)^{n+1} \frac{\sqrt{n}}{n+1}$

(e) $\sum \ln \left(\frac{n}{3n+1} \right)$

(f) $\sum \frac{\sqrt{n+1} - \sqrt{n-1}}{n}$

(g) $\sum \frac{n^3}{5^n}$

(h) $\sum (-1)^n \frac{\sqrt{n}}{\ln n}$

- 4) Write the function

$$f(x) = \frac{2x^2}{3 + 4x}$$

as a power series centered at 0 and determine the interval of convergence.