Instructions for this exam:

- You have 1 hour to write solutions to the four problems below. Each problem is worth 8 points.

- You must write in complete sentences and justify all of your work.

- You are NOT allowed to use outside resources, such as notes, the textbook, the internet, or people.

- Before you begin, copy the following statement and sign your name:

    "All solutions will be my own and I will not consult outside resources. I understand that doing otherwise would be unfair to my classmates and a violation of the U's honor code."
    -Your Signature

- At the end of 1 hour, stop writing and begin scanning your solutions and uploading them to Gradescope, as you would do with a homework assignment.

    – Create a PDF scan of your work and save it to your computer.
    – Go to `https://www.gradescope.com/courses/79451`, click "Exam 4" to upload your PDF.

- If technical difficulties arise, private-message me in the chat, or send an email to moss@math.utah.edu.

Exam 4, Math 3210
December 9, 2020

1. (8 pts) Prove the following statement, or give a counterexample showing it is false:

    "if $|f|$ is integrable on an interval $[a, b]$, then f is integrable on $[a, b]$.".

2. (8 pts) Prove that $\displaystyle\sum_{k=0}^{\infty} \int_{1/2}^{3/4} x^k dx = \ln(2)$.

3. (8 pts) Determine whether the following series is conditionally convergent, absolutely convergent, or divergent:
$$\sum_{k=1}^{\infty} (-1)^{k+1} \frac{\sqrt{k}}{2k^2 - 1}.$$

4. (8 pts) Find the radius of convergence of the power series
$$\sum_{k=1}^{\infty} 3^k x^{2k}.$$