

The following written homework problems are due on Gradescope by 6:00pm the day before your class day. You also have a WebWork assignment due at 11pm two days before your next class.

- (14.1) (a) Find a power series representation for  $f(x) = \frac{3}{1+x}$ . What is its radius of convergence?  
 (b) Use (a) to find a power series representation for  $g(x) = 3\ln(1+x)$ . What is its radius of convergence?  
 (c) Verify that the *intervals* of convergence for your series in (a) and (b) are different, even though their radii of convergence are the same.
- (14.2) Let  $f(x) = \sum_{n=2}^{\infty} \frac{x^n}{n-1}$ . Find the intervals of convergence for  $f$ ,  $f'$ , and  $f''$ .
- (14.3) Let  $f(x) = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!} = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \frac{x^9}{9!} - \cdots$ .
- (a) Show  $f(x)$  converges for all  $x$ .  
 (b) Verify that  $f(x)$  is an odd function.  
 (c) Find  $f(0)$  and  $f'(0)$ .  
 (d) Verify that  $f''(x) = -f(x)$ .  
 (e) Make a conjecture about which standard, well-known function  $f(x)$  is equal to.

*Hint: Which well-known function has all of those properties? You do not need to prove your conjecture; we'll do that next week.*

**(14.4) Professional Problem.**

*The Professional Problem this week is the "Sequences and Series Toolbox," which is a review document you'll fill out as part of studying for our upcoming exam. The Toolbox will not be due until May 10th, but you can work on it now! See Canvas for more details.*

**You should have questions!**

When you do, here's what to do:

1. Post your question on Canvas.
2. Email *all* of the instructors with your question.
3. Write your solution (even if you're unsure about it) and ask about it at our online study session on Monday.

<i>Instructor</i>	<i>Email</i>
Alexis Johnson	<a href="mailto:akjohns@umn.edu">akjohns@umn.edu</a>
Julie Leifeld	<a href="mailto:leif0020@umn.edu">leif0020@umn.edu</a>
Jonathan Rogness	<a href="mailto:rogness@umn.edu">rogness@umn.edu</a>
Anila Yadavalli	<a href="mailto:anilayad@umn.edu">anilayad@umn.edu</a>
Eric Erdmann (Duluth)	<a href="mailto:erdm0063@d.umn.edu">erdm0063@d.umn.edu</a>
Paul Kinion (Rochester)	<a href="mailto:paulkinion@gmail.com">paulkinion@gmail.com</a>