Weekly Assignment 10

MAT 229, Spring 2021

Instructions: **Show your work!**

1. Let $f(x) = \sum_{n=1}^{\infty} (-1)^{n+1} \frac{(x-2)^n}{2^n n}$

- What is the domain of $f(x)$? In other words, what is the interval of convergence for the power series?

- Approximate $\int_2^4 f(x)\, dx$ with error less than 0.0001.

2. Let $g(x) = \sum_{n=0}^{\infty} (-1)^n \frac{(x-\pi)^{2n}}{(2n)!}$

- What is the domain of $g(x)$? In other words, what is the interval of convergence for the power series?

- Find a power series representation for $g'(x)$.

3. Let $h(x) = x \ln(1 + x)$

- Using geometric series, what is a power series representation for $h(x)$ centered at 0?

- Using the power series representation, approximate $\int_0^1 h(x)\, dx$ with error less than 0.0001.