Math 121, Sections 01, 02, 03, Fall 2021

Homework #18

Goal: Exploring Estimating Values and Definite Integrals using the Alternating Series Estimation Theorem. Also some review of Interval and Radius of Convergence

1. Use Series to Estimate $\dfrac{1}{e}$ with error less than $\dfrac{1}{20}$. Justify.

2. Use Series to Estimate $\dfrac{1}{e}$ with error less than $\dfrac{1}{100}$. Justify. (Can reuse work from 1)

3. Use Series to Estimate $\dfrac{1}{e}$ with error less than $\dfrac{1}{500}$. Justify. (Can reuse work from 1)

4. Use Series to Estimate $\sin(1)$ with error less than $\dfrac{1}{1000}$. Justify.

5. Use Series to Estimate $e^{-\frac{1}{3}}$ with error less than $\dfrac{1}{100}$. Justify.

6. Use Series to Estimate $\arctan\left(\dfrac{1}{2}\right)$ with error less than $\dfrac{1}{100}$. Justify.

7. Use Series to Estimate $\displaystyle\int_0^1 x\ln(1+x^3)\ dx$ with error less than $\dfrac{1}{20}$. Justify.

8. Use Series to Estimate $\displaystyle\int_0^1 x\sin(x^2)\ dx$ with error less than $\dfrac{1}{1000}$. Justify.

Review: Find the Interval and Radius of Convergence for each of the following.

9. $\displaystyle\sum_{n=1}^{\infty}(n!)^2(3x-7)^n$　　　10. $\displaystyle\sum_{n=1}^{\infty}\dfrac{(-1)^n\ (5x-2)^n}{n^3\ 8^n}$　　　11. $\displaystyle\sum_{n=1}^{\infty}\dfrac{(x-7)^n}{n!\ \sqrt{n}}$

<u>REGULAR OFFICE HOURS</u>

Monday: 1:00–3:00 pm

9–10:30 pm TA Mia, SMUDD 207

Tuesday: 12:00–4:00 pm

6–7:30 pm TA Ian, SMUDD 207

7:30–9:00 pm TA Karime, SMUDD 207

Wednesday: 1:00-3:00 pm

6–7:30 pm TA Ian, SMUDD 207

7:30–9:00 pm TA Daksha, SMUDD 207

Thursday: none for Professor

1–2:30 pm TA Mia, SMUDD 207

7:30–9:00 pm TA Daksha, SMUDD 207

Friday: 12:00–2:00 pm

2:30–4:00 pm TA Karime, SMUDD 014**

Chase the fine details and make a full justification.

Almost vacation!