Spring 2020 Math 152

Week in Review VIII

courtesy: David J. Manuel

(covering 11.2, 11.3, and Exam II Review)

1 Section 11.2

1. Find the sum of the series $\displaystyle\sum_{n=1}^{\infty} \frac{2^n + (-4)^n}{6^n}$.

2. Find the sum of $\displaystyle\sum_{n=1}^{\infty} \frac{2}{n^2 + 2n}$.

3. If $\displaystyle\sum_{n=1}^{N} a_n = 4 + \ln(2N) - \ln(N+1)$, what is $\displaystyle\sum_{n=1}^{\infty} a_n$?

2 Section 11.3

1. Determine whether the series $\displaystyle\sum_{n=0}^{\infty} ne^{-n^2}$ is convergent or divergent.

2. Show the series $\displaystyle\sum_{n=1}^{\infty} \frac{\ln n}{n^3}$ is convergent. Estimate the maximum possible error when using s_{10} as an approximation for the sum of the series.

3. Find the number of terms required to approximate $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n^6}$ to with 10^{-10}.

3 Exam II Review

1. Evaluate the following integrals:

   (a) $\displaystyle\int_0^{\sqrt{2}/6} \sqrt{1 - 9x^2}\, dx$

   (b) $\displaystyle\int \frac{(x-1)^2}{x^3 + x}\, dx$

   (c) $\displaystyle\int \frac{\sqrt{x^2 - 4}}{x}\, dx$

   (d) $\displaystyle\int_{-2}^{4} \frac{1}{x^2}\, dx$

2.

   (a) Evaluate $\displaystyle\int_1^{\infty} e^{-5x}\, dx$.

   (b) Determine whether $\displaystyle\int_1^{\infty} \frac{1}{x + e^{5x}}\, dx$ converges or diverges.

3. Find the limit of the following or explain why they diverge:

   (a) $a_n = \sqrt{\dfrac{3n+1}{4n+3}}$

   (b) $a_n = \dfrac{(-1)^n(2n^2 + 2)}{3n^2 + 1}$