Math 1497 – Calculus II Spring 2021 – Homework 4

Week 5: Feb. 14-18, 2022

pg. 596, #5, 31, and 37.

Determine whether the following sequences converge or diverge. If it converges, find the limit.

5. $a_n = \dfrac{5}{n+2}$ 31. $a_n = (-1)^n \dfrac{n}{n+1}$ 37. $a_n = \dfrac{(n+1)!}{n!}$ 41. $a_n = 2^{1/n}$

pg. 597, #53 and 57.

Determine whether the following sequences are increasing or decreasing and if they are bounded?

53. $a_n = 4 - \dfrac{1}{n}$ 57. $a_n = \left(\dfrac{2}{3}\right)^n$

pg. 605, #5, 6, and 7.

Find the partial sums S_1, S_2, S_3, S_4 and S_5 of the following

5. $1 + \dfrac{1}{4} + \dfrac{1}{9} + \dfrac{1}{16} + \cdots$
6. $\dfrac{1}{2 \cdot 3} + \dfrac{2}{3 \cdot 4} + \dfrac{3}{4 \cdot 5} + \dfrac{4}{5 \cdot 6} + \cdots$
7. $3 - \dfrac{9}{2} + \dfrac{27}{4} - \dfrac{81}{8} + \dfrac{243}{16} - \cdots$

pg. 605, #11, 12, 19 and 20.

Do the following convergence or diverge? If they converge, find the sum.

11. $\displaystyle\sum_{n=0}^{\infty} 5\left(\frac{5}{2}\right)^n$ 12. $\displaystyle\sum_{n=0}^{\infty} 4\,(-1.06)^n$

19. $\displaystyle\sum_{n=0}^{\infty} 5\left(\frac{5}{6}\right)^n$ 20. $\displaystyle\sum_{n=1}^{\infty} 2\left(-\frac{1}{2}\right)^n$

pg. 605, #31, and 32. Find the sum of the following

31. $\displaystyle\sum_{n=1}^{\infty} \frac{4}{n(n+2)}$ 32. $\displaystyle\sum_{n=1}^{\infty} \frac{1}{(2n+1)(2n+3)}$

pg. 605, #46, 47, 48 and 51. Do the following converge of diverge?

46. $\displaystyle\sum_{n=0}^{\infty} \frac{6^n}{n+1}$ 47. $\displaystyle\sum_{n=1}^{\infty} \frac{n+1}{2n-1}$

48. $\displaystyle\sum_{n=1}^{\infty} \frac{4n+3}{3n-1}$ 51. $\displaystyle\sum_{n=1}^{\infty} \frac{3^n}{n^3}$

pg. 613, #3, 5, 9, 11, 13, and 15. Using the integral test, determine whether the following convergence or diverge?

3. $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n+3}$ 5. $\displaystyle\sum_{n=1}^{\infty} \frac{1}{2^n}$

9. $\displaystyle\frac{\ln 2}{2} + \frac{\ln 3}{3} + \frac{\ln 4}{4} + \frac{\ln 5}{5} +$ 11. $\displaystyle\frac{1}{3} + \frac{1}{5} + \frac{1}{7} + \frac{1}{9} +$

13. $\displaystyle\sum_{n=1}^{\infty} \frac{\tan^{-1} n}{1+n^2}$ 15. $\displaystyle\sum_{n=1}^{\infty} \frac{\ln n}{n^2}$

Due: Friday Feb. 18, 2022 by 4pm.