Math 21C
Kouba
Discussion Sheet 8

1.) Determine convergence or divergence of each series using the test indicated. I suggest that you read all of the assumptions and conclusions for each test from the handout I gave last time as you do each problem.

a.) $\displaystyle\sum_{n=3}^{\infty} \frac{2n+3}{3n+2}$ (Use the nth term test.)

b.) $\displaystyle\sum_{n=4}^{\infty} 7\frac{(-2)^{n+1}}{3^{n-1}}$ (Use the geometric series test.)

c.) $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n^{\sqrt{2}}}$ (Use the p-series test.)

d.) $\displaystyle\sum_{n=2}^{\infty} \frac{n}{n^2+4}$ (Use the integral test.)

e.) $\displaystyle\sum_{n=1}^{\infty} \left\{\frac{1}{\sqrt{n+1}} - \frac{1}{\sqrt{n+2}}\right\}$ (Use the sequence of partial sums test.)

f.) $\displaystyle\sum_{n=2}^{\infty} \frac{n-1}{n^3+2}$ (Use the comparison test.)

g.) $\displaystyle\sum_{n=1}^{\infty} \frac{n^3+7n^2-3}{n^4-4n+9}$ (Use the limit comparison test.)

2.) Use any test to determine the convergence or divergence of each series.

a.) $\displaystyle\sum_{n=1}^{\infty} \cos(1/n^2)$ b.) $\displaystyle\sum_{n=1}^{\infty} \sin(1/n^2)$ c.) $\displaystyle\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^2}$ d.) $\displaystyle\sum_{n=1}^{\infty} 3\left(2^{-n}\right)$

e.) $\displaystyle\sum_{n=1}^{\infty} 2\left(n^{-3}\right)$ f.) $\displaystyle\sum_{n=0}^{\infty} \sqrt{\frac{n+3}{n^3+8}}$ g.) $\displaystyle\sum_{n=1}^{\infty} \frac{2^n+3^n}{5^n-2^n}$ h.) $\displaystyle\sum_{n=1}^{\infty} \frac{1}{1+2+3+\cdots+n}$

i.) $\displaystyle\sum_{n=3}^{\infty} \frac{1}{\ln n}$ j.) $\displaystyle\sum_{n=2}^{\infty} \frac{\ln n}{n^3}$

3.) Consider the series $\displaystyle\sum_{n=3}^{\infty} \frac{1}{4n^2-1}$.

a.) Use the limit comparison test to show that the series converges.

b.) Use partial fractions then the sequence of partial sums to find the exact value of this series.

4.) Find the exact value of the following convergent series :

$$\frac{3^{-3}}{10^1} - \frac{3^{-1}}{10^2} + \frac{3^1}{10^3} - \frac{3^3}{10^4} + \frac{3^5}{10^5} - \frac{3^7}{10^6} \cdots$$

5.) Use a geometric series to convert the decimal number 0.2525252525... to a fraction.

"Talking is not teaching and listening is not learning." – Unknown