ESP
Kouba
Worksheet 9

1.) Determine which series converge and which diverge. State the name of the test you are using.

a.) $\sum_{n=3}^{\infty} 2^{-n}$

b.) $\sum_{n=0}^{\infty} \left(\frac{\pi}{e}\right)^n$

c.) $\sum_{n=1}^{\infty} n \sin\left(\frac{1}{n}\right)$

d.) $\sum_{n=2}^{\infty} \arcsin\left(\frac{1}{n}\right)$

e.) $\sum_{n=0}^{\infty} \frac{3^n}{2^n+3^n}$

f.) $\sum_{n=0}^{\infty} \frac{2^{n+1}}{n!}$

g.) $\sum_{n=1}^{\infty} \frac{e^n}{(2n)!}$

h.) $\sum_{n=1}^{\infty} \frac{n^6}{8^{n+1}}$

i.) $\sum_{n=0}^{\infty} \frac{n^n}{n!}$

j.) $\sum_{n=1}^{\infty} \frac{3^{n+1}}{n^n}$

k.) $\sum_{n=0}^{\infty} \left(\frac{n}{2n+3}\right)^n$

l.) $\sum_{n=7}^{\infty} \frac{7}{n^2+3}$

m.) $\sum_{n=2}^{\infty} \sqrt{\frac{n}{n^2-1}}$

n.) $\sum_{n=1}^{\infty} \ln n$

o.) $\sum_{n=2}^{\infty} \frac{1}{\ln n}$

p.) $\sum_{n=2}^{\infty} \frac{1}{n \ln n}$

q.) $\sum_{n=1}^{\infty} \ln\left(\frac{n+1}{n}\right)$

r.) $\sum_{n=2}^{\infty} \frac{1}{(\ln n)^{1/n}}$

s.) $\sum_{n=2}^{\infty} \frac{1}{(\ln n)^n}$

t.) $\sum_{n=0}^{\infty} \frac{2}{1+3^n}$

u.) $\sum_{n=0}^{\infty} \frac{100n}{n^2+2} \left(\frac{1}{4}\right)^{2n}$

v.) $\sum_{n=0}^{\infty} \frac{(-1)^n}{n+7}$

w.) $\sum_{n=1}^{\infty} (-1)^n \frac{3n^2+1}{5n^2+9}$

x.) $\sum_{n=0}^{\infty} (-1)^{n+1} \frac{n}{(n+5)^2}$

Y.) $\sum_{n=3}^{\infty} \frac{1+2(-1)^n}{n^2}$

z.) $\sum_{n=0}^{\infty} (-1)^n \left(\frac{1}{3}\right)^n$

A.) $1 - \frac{1}{3} - \frac{1}{9} + \frac{1}{27} - \frac{1}{81} - \frac{1}{243} + \frac{1}{729} - \frac{1}{2187} - \cdots$

B.) $\sum_{n=1}^{\infty} \frac{1}{n + \ln(n^2)}$

C.) $\sum_{n=1}^{\infty} \left[\frac{\ln n}{\ln(n^2+3)}\right]^n$

D.) $\sum_{n=1}^{\infty} \frac{\sqrt{n+1} - \sqrt{n}}{n}$

E.) $\sum_{n=0}^{\infty} \left(\frac{n+1}{n+3}\right)^{n^2}$

F.) $\lim_{n \to \infty} \sum_{i=1}^{n} \frac{1}{4 + \left(\frac{i}{n}\right)^2} \cdot \frac{1}{n}$

G.) $\lim_{n \to \infty} \sum_{i=1}^{n} \sqrt{2 + \frac{3i}{n}} \cdot \frac{3}{n}$

2.) Each of the following infinite series converges. Determine what n should be in order that the sum of the first n terms estimates the value of the series with absolute error at most 0.00001.

a.) $\sum_{n=1}^{\infty} \frac{(-1)^n}{n^5}$

b.) $\sum_{n=1}^{\infty} \frac{(-1)^n}{n}$

c.) $\sum_{n=1}^{\infty} \frac{1}{1+n^2}$