

WORKSHEET 07/05/2016

1. Find the sum or show that it diverges :

$$\sum_{n=1}^{\infty} \frac{5}{2^n} - \frac{1}{3^n} \qquad \sum_{n=1}^{\infty} \frac{2^{n+1}}{5^n} \qquad \sum_{n=1}^{\infty} \frac{e^n}{e^n+n}$$

$$\sum_{n=1}^{\infty} \left(\frac{3}{n^2} - \frac{3}{(n+1)^2} \right) \qquad \sum_{n=1}^{\infty} (\ln \sqrt{n+1} - \ln \sqrt{n}) \qquad \sum_{n=1}^{\infty} \frac{4}{(4n-3)(4n+1)}$$

2. Write the following numbers as ratio of two integers:

$$0.\overline{23} \qquad 1.\overline{414} \qquad 1.24\overline{123}$$

3. Find the values of x for which the following series converge and find the limit in terms of x if convergent:

$$\sum_{n=0}^{\infty} 2^n x^n \qquad \sum_{n=0}^{\infty} \left(-\frac{1}{2}\right)^n (x-3)^n \qquad \sum_{n=0}^{\infty} \sin^n(x)$$

4. Use convergence tests to determine which of the following series are convergent and justify your answers:

$$\sum_{n=1}^{\infty} \frac{1}{n^2+4} \qquad \sum_{n=2}^{\infty} \frac{\ln(n^2)}{n} \qquad \sum_{n=1}^{\infty} \frac{3}{\sqrt{n}}$$

$$\sum_{n=1}^{\infty} \frac{5^n}{4^{n+3}}$$

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

$$\sum_{n=1}^{\infty} n \tan \frac{1}{n}$$

$$\sum_{n=1}^{\infty} \frac{\sqrt{n+1}}{\sqrt{n^2+3}}$$

$$\sum_{n=1}^{\infty} \frac{5^n}{\sqrt{n}4^n}$$

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

$$\sum_{n=1}^{\infty} \frac{2^n}{n!}$$

$$\sum_{n=1}^{\infty} \frac{3^{n+2}}{\ln n}$$

$$\sum_{n=1}^{\infty} \left(\frac{4n+3}{3n-5}\right)^n$$

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

$$\sum_{n=1}^{\infty} \frac{n^{10}}{10^n}$$

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