

1) Find the values of the following series (the last two by partial fractions).

$$a) \sum_2^{\infty} \frac{1}{n-1} \qquad b) \sum_2^{\infty} \frac{1}{n(n-1)} \qquad b) \sum_1^{\infty} \frac{4n+2}{n^2(n+1)^2}$$

2) Determine whether the following series are convergent or divergent. Show your reasoning.

i)

$$\sum_1^{\infty} \frac{1}{\sqrt{n(n+1)}}$$

ii)

$$\sum_1^{\infty} \frac{1}{n(\ln n)^s} \qquad (s \text{ some number})$$

iii)

$$\sum_1^{\infty} n e^{-n^2}$$

iv)

$$\sum_1^{\infty} \frac{1 + \sqrt{n}}{(n+1)^3 - 1}$$

v)

$$\sum_1^{\infty} (n^{1/n} - 1)^n$$

vi)

$$\sum_1^{\infty} \frac{(n!)^2}{2n^2}$$

vii)

$$\sum_1^{\infty} e^{-n^2}$$

viii)

$$\sum_1^{\infty} \frac{n^{n+1/n}}{(n+1/n)^n} \qquad (\text{Tricky!})$$

ix)

$$\sum_2^{\infty} \frac{1}{(\ln n)^{1/n}}$$

x)

$$\sum_1^{\infty} \frac{2^n n!}{n^n}$$

xi)

$$\sum_1^{\infty} \frac{3^n n!}{n^n}$$