

EJERCICIOS:

I) Calcular la suma de las series:

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

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

3) $\sum_{n=3}^{\infty} \frac{1}{4n^2 - 1}$

4) $\sum_{n=2}^{\infty} \left(\frac{1}{3^{n-1}} + \frac{1}{4^{n-1}} \right) = \frac{1}{6}$

5) $\sum_{n=3}^{\infty} \frac{2^n - 1}{4^n}$

6) $\sum_{k=1}^{\infty} \frac{1}{2k(k+1)} = \frac{1}{2}$

7) $\sum_{n=0}^{\infty} \frac{3}{10^n} = \frac{10}{3}$

8) $\sum_{n=0}^{\infty} \frac{2}{3^{n-1}} = 3$

9) $\sum_{n=0}^{\infty} \frac{3^n + 4^n}{5^n} = \frac{15}{2}$

10) $\sum_{n=1}^{\infty} \frac{1}{n(n+1)(n+2)} = \frac{1}{4}$

11) $\sum_{n=0}^{\infty} \frac{1-2^n}{3^n} = \frac{-3}{2}$

12) $\sum_{n=0}^{\infty} \left[\frac{25}{10^n} - \frac{6}{100^n} \right]$

13) $\sum_{n=0}^{\infty} \frac{1}{2^{n+1}} = \frac{1}{2}$

14) $\sum_{n=0}^{\infty} \frac{1}{2^{n+3}} = \frac{1}{4}$

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

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

17) $\sum_{n=1}^{\infty} \operatorname{Ln} \left(\frac{n}{n+1} \right)$

18) $\sum_{n=1}^{\infty} \left(\frac{e}{\pi} \right)^n$

19) $1 + e^{-1} + e^{-2} + \dots + e^{-n} + \dots$

20) $\sum_{n=1}^{\infty} (\sqrt{2})^{1-n}$

21) $\sum_{n=1}^{\infty} \operatorname{Ln} \left(\frac{n+1}{n} \right)$

22) $\sum_{n=0}^{\infty} \frac{4}{16n^2 - 8n - 3}$

23) $\sum_{n=1}^{\infty} \left(\frac{\pi}{e} \right)^n$

II) Estudiar la convergencia de las series:

1) $\sum_{n=1}^{\infty} \frac{n!}{1 \cdot 3 \cdot 5 \cdot \dots \cdot (2n-1)}$

2) $\sum_{n=1}^{\infty} \frac{\operatorname{Ln}(n+1)}{(n+1)^3}$

3) $\sum_{n=1}^{\infty} \left(\frac{\sqrt{n+5}}{\sqrt{4n+2}} \right)^{n^2+1}$

4) $\sum_{n=1}^{\infty} \frac{n + \operatorname{Ln}(n)}{n^3 + 2n - 1}$

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

6) $\sum_{n=2}^{\infty} \frac{\operatorname{Ln}(n)}{e^n}$

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

8) $\sum_{n=2}^{\infty} \frac{1}{n[\operatorname{Ln}(n)]^k}$

9) $\sum_{n=2}^{\infty} \frac{1}{n[\operatorname{Ln}(n)]^{5k-1}}$

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

11) $\sum_{n=0}^{\infty} \frac{2 + \operatorname{Sen}(n)}{\sqrt[3]{n^4 + 1}}$

12) $\sum_{n=0}^{\infty} \frac{3 - \operatorname{Cos}(n)}{\sqrt[5]{5n^8 + 3n^2 + 1}}$

$$\begin{array}{lll}
13) \sum_{n=1}^{\infty} \left(1 - \frac{1}{n}\right)^{-3n} & 14) \sum_{n=1}^{\infty} n e^{-n^2} & 15) \sum_{n=1}^{\infty} \frac{\sqrt{2n^2+1} - \sqrt[3]{n^2+1}}{\sqrt{n^5+3}} \\
16) \sum_{n=1}^{\infty} \frac{5^n (n!)^3}{(n+1)^{n+1} (n+2)^{n+3}} & 17) \sum_{n=2}^{\infty} \frac{n^2+1}{n \operatorname{Ln}(n)} & 18) \sum_{n=1}^{\infty} \frac{3^n+5}{4^n+n^2} \\
19) \sum_{n=1}^{\infty} \frac{2^n+2n}{e^{2n}+n} & 20) \sum_{n=2}^{\infty} \left(\frac{n+2}{n+1}\right)^{n^2} & 21) \sum_{n=1}^{\infty} \frac{1 \cdot 3 \cdot 5 \cdots (2n-1)}{n!} \\
22) \sum_{n=2}^{\infty} \frac{2n+1}{n \operatorname{Ln}(n)} & 23) \sum_{n=1}^{\infty} \frac{1 \cdot 4 \cdot 7 \cdots (3n-2)}{3 \cdot 6 \cdot 9 \cdots (3n)} & 24) \sum_{n=1}^{\infty} \frac{n!}{n^n} \\
25) \sum_{n=1}^{\infty} \left(\frac{n+2}{n-3}\right)^{n^2+2n} & 26) \sum_{n=1}^{\infty} \left(\frac{n}{2n+1}\right)^{2n^2+n+1} & 27) \sum_{n=1}^{\infty} \operatorname{Cos}\left(\frac{\pi}{2n^2-1}\right) \\
28) \sum_{n=1}^{\infty} \frac{\sqrt{n+1} \cdot \operatorname{Sen}\left(\frac{1}{n}\right)}{\sqrt[3]{n^2+1}} & 29) \sum_{n=1}^{\infty} \frac{n^n (1 \cdot 6 \cdot 11 \cdots (5n-4))}{n! e^n (4 \cdot 8 \cdot 12 \cdots (4n))} & 30) \sum_{n=1}^{\infty} \operatorname{Ln}\left(1 + \frac{1}{|\operatorname{Sen}(n)|}\right) \\
31) \sum_{n=1}^{\infty} \frac{\sqrt[3]{n}}{(2n-1)(5\sqrt[3]{n}-1)} & 32) \sum_{n=1}^{\infty} \frac{1}{n\sqrt[3]{n}-\sqrt{n}} & 33) \sum_{n=1}^{\infty} \frac{(n!)^2}{2n!} \\
34) \sum_{n=2}^{\infty} \frac{n+1}{n[\operatorname{Ln}(n)]^n} & 35) \sum_{n=1}^{\infty} \operatorname{Tag}\left(\frac{1}{n}\right) & 36) \sum_{n=1}^{\infty} \left(\frac{n^2-4n+5}{n^2+5n-3}\right)^{n^2-n+1} \\
37) \sum_{n=1}^{\infty} \frac{1}{\sqrt{n}} \cdot \operatorname{Ln}\left(\frac{n+1}{n-1}\right) & 38) \sum_{n=1}^{\infty} \frac{\operatorname{Sen}^2\left(\frac{1}{n}\right)}{n} & 39) \sum_{n=1}^{\infty} \operatorname{ArcSen}\left(\frac{1}{\sqrt{n}}\right) \\
40) \sum_{n=2}^{\infty} \frac{1}{n \operatorname{Ln}(n) + \sqrt{\operatorname{Ln}^3(n)}} & 41) \sum_{n=1}^{\infty} \operatorname{Ln}\left(\frac{n^2+1}{n^2}\right) &
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