Esercizi sulle serie

Stabilire se le seguenti serie sono convergenti:

1. $\displaystyle\sum_{n=1}^{+\infty} \frac{1}{\sqrt{n(n+1)}}$ [NO];   **2.** $\displaystyle\sum_{n=1}^{+\infty} \frac{1}{\sqrt{n(n^2+1)}}$ [SI];   **3.** $\displaystyle\sum_{n=0}^{+\infty} \frac{1}{n!}$ [SI];

4. $\displaystyle\sum_{n=1}^{+\infty} \frac{\ln n}{n}$ [NO];   **5.** $\displaystyle\sum_{n=1}^{+\infty} \frac{\ln n}{\sqrt{n^2+n}}$ [NO];   **6.** $\displaystyle\sum_{n=0}^{+\infty} \frac{\ln n+1}{\sqrt{n^3+1}}$ [SI];

7. $\displaystyle\sum_{n=1}^{+\infty} \frac{1}{n+\ln n}$ [NO];   **8.** $\displaystyle\sum_{n=0}^{+\infty} \frac{\cos^2 n}{n!}$ [SI];   **9.** $\displaystyle\sum_{n=0}^{+\infty} \frac{\sin^2 n}{2^n}$ [SI];

10. $\displaystyle\sum_{n=2}^{+\infty} \frac{1}{\sqrt{n(n-1)}}$ [NO];   **11.** $\displaystyle\sum_{n=1}^{+\infty} \frac{\sqrt{n+1}}{n+\sqrt[3]{n^2}}$ [NO];   **12.** $\displaystyle\sum_{n=1}^{+\infty} \arcsin \frac{2n}{4n^2+1}$ [NO];

13. $\displaystyle\sum_{n=1}^{+\infty} \ln(1+\frac{1}{n})$ [NO];   **14.** $\displaystyle\sum_{n=1}^{+\infty} \frac{\ln(1+\frac{1}{n})}{\sqrt{n}}$ [SI];   **15.** $\displaystyle\sum_{n=1}^{+\infty} \frac{\sqrt{n(n-1)}}{n^3+2\sqrt{n}-3\ln n}$ [SI];

16. $\displaystyle\sum_{n=1}^{+\infty} \ln(\frac{1+\tan 1/n}{1-\tan 1/n})$ [NO];   **17.** $\displaystyle\sum_{n=1}^{+\infty} \frac{3^n+5n+2}{4^n+n^2+3n}$ [SI];   **18.** $\displaystyle\sum_{n=1}^{+\infty} \frac{n^2+1}{n!}$ [SI];

19. $\displaystyle\sum_{n=1}^{+\infty} \frac{n(n+1)}{2^n}$ [SI];   **20.** $\displaystyle\sum_{n=1}^{+\infty} \frac{(2n)!}{n^n}$ [NO];   **21.** $\displaystyle\sum_{n=1}^{+\infty} \frac{n^\alpha}{n!}$ $\alpha \in \mathbb{R}$ [SI];

22. $\displaystyle\sum_{n=1}^{+\infty} \frac{\alpha^n}{n!}$ $\alpha \in \mathbb{R}$ [SI];   **23.** $\displaystyle\sum_{n=2}^{+\infty} e^{-n^2+3n}$ [SI];   **24.** $\displaystyle\sum_{n=1}^{+\infty} 2^{-3n^4+2n}$ [SI];

25. $\displaystyle\sum_{n=1}^{+\infty} \ln\left(\frac{\frac{1}{\sqrt{n}}}{\sin\frac{1}{\sqrt{n}}}\right)$ [NO];   **26.** $\displaystyle\sum_{n=1}^{+\infty} \frac{n^2}{n+2^n}$ [SI];   **27.** $\displaystyle\sum_{n=1}^{+\infty} \frac{1}{n\sqrt[n]{n}}$ [NO].

Studiare il carattere (convergenza semplice e assoluta) delle seguenti serie a termini alterni:

28. $\displaystyle\sum_{n=1}^{+\infty}(-1)^n\frac{3n-1}{2n+1}$ [NON CONV];

29. $\displaystyle\sum_{n=1}^{+\infty}(-1)^{n+1}\frac{n}{4n-3}$ [NON CONV];

30. $\displaystyle\sum_{n=1}^{+\infty}(-1)^{n-1}\frac{n}{(n+1)^2}$ [CONV, NON ASS];

31. $\displaystyle\sum_{n=2}^{+\infty}\frac{(-1)^n}{\ln n}$ [CONV, NON ASS];

32. $\displaystyle\sum_{n=1}^{+\infty}\frac{(-1)^n}{n+\ln n}$ [CONV, NON ASS];

33. $\displaystyle\sum_{n=1}^{+\infty}\frac{(-1)^{n-1}}{\sqrt{n}}$ [CONV, NON ASS];

34. $\displaystyle\sum_{n=1}^{+\infty}\frac{(-1)^n}{\sqrt{n^2(n+1)}}$ [CONV ASS];

35. $\displaystyle\sum_{n=1}^{+\infty}\frac{(-1)^n n^5}{e^n}$ [CONV ASS].