Semplici esercizi sulle serie numeriche

Es. 1 Determinare il carattere delle seguenti serie numeriche e se possibile calcolare il valore della somma.

1. $\displaystyle\sum_{n=0}^{\infty} \frac{1}{3^n}$
2. $\displaystyle\sum_{n=0}^{\infty} \left(\frac{5}{3}\right)^n$
3. $\displaystyle\sum_{n=0}^{\infty} \left(\frac{8}{9}\right)^n$
4. $\displaystyle\sum_{n=0}^{\infty} \left(-\frac{1}{8}\right)^n$
5. $\displaystyle\sum_{n=0}^{\infty} (-2)^n$
6. $\displaystyle\sum_{n=1}^{\infty} \frac{1}{3n}$
7. $\displaystyle\sum_{n=1}^{\infty} \left(\frac{1}{2^n} + \frac{5}{4^n}\right)$
8. $\displaystyle\sum_{n=0}^{\infty} n^2$
9. $\displaystyle\sum_{n=1}^{\infty} \log(n)$
10. $\displaystyle\sum_{n=0}^{\infty} \left(\frac{n}{3} + \frac{3}{n^2+5}\right)$
11. $\displaystyle\sum_{n=1}^{\infty} \left(\frac{1}{n} + \frac{1}{2^n}\right)$
12. $\displaystyle\sum_{n=1}^{\infty} \log\left(2 + \frac{1}{n}\right)$
13. $\displaystyle\sum_{n=0}^{\infty} \frac{1}{n+2}$
14. $\displaystyle\sum_{n=0}^{\infty} \frac{n}{n^2+1}$
15. $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n^3}$
16. $\displaystyle\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}}$
17. $\displaystyle\sum_{n=1}^{\infty} \left(\frac{2}{n^2} + \frac{1}{n^3}\right)$
18. $\displaystyle\sum_{n=1}^{\infty} \log\left(1 + \frac{1}{\sqrt{n}}\right)$
19. $\displaystyle\sum_{n=1}^{\infty} (e^{1/n^2} - 1)$
20. $\displaystyle\sum_{n=1}^{\infty} (e^{1/\sqrt{n}} - 1)$
21. $\displaystyle\sum_{n=1}^{\infty} \sin\left(\frac{1}{n^4}\right)$
22. $\displaystyle\sum_{n=1}^{\infty} \sin\left(\frac{1}{2n}\right)$
23. $\displaystyle\sum_{n=1}^{\infty} \left(1 - \cos\left(\frac{1}{n}\right)\right)$
24. $\displaystyle\sum_{n=1}^{\infty} \left(1 - \cos\left(\frac{1}{\sqrt{n}}\right)\right)$