Series

Find n-th partil sum S_n and the sum S

1. $\sum_{k=1}^{\infty} \frac{1}{(3k-2)(3k+1)}$
2. $\sum_{k=0}^{\infty} \frac{2}{(2k+1)(2k+3)}$
3. $\sum_{k=1}^{\infty} \frac{2k+1}{k^2(k+1)^2}$
4. $\sum_{k=1}^{\infty} k$

   Comparison test
5. $\sum_{k=0}^{\infty} \frac{1}{(k+2)3^k}$
6. $\sum_{k=1}^{\infty} \frac{(2k-1)(k-1)}{k^2(k+1)^2}$
7. $\sum_{k=0}^{\infty} 2^k \sin\frac{\pi}{3^k}$

   Ratio test and root test
8. $\sum_{k=1}^{\infty} \frac{1}{k!}$
9. $\sum_{k=0}^{\infty} \frac{1}{(k+1)^k}$
10. $\sum_{k=1}^{\infty} \frac{3^k k!}{(k^k}$
11. $\sum_{k=1}^{\infty} \left(\frac{2k}{3k-1}\right)^k$
12. $\sum_{k=1}^{\infty} \frac{1,1^k}{k}$

13. $\displaystyle\sum_{k=1}^{\infty} 2^{-k} \left(\frac{k+1}{k}\right)^{k^2}$

    Integral test

14. $\displaystyle\sum_{k=0}^{\infty} \frac{2}{(2k+1)^2}$

15. $\displaystyle\sum_{k=0}^{\infty} \frac{1}{2k+1}$

16. $\displaystyle\sum_{k=2}^{\infty} \frac{1}{k \ln^2 k}$

17. $\displaystyle\frac{1}{2} + \frac{2}{5} + \frac{3}{10} + \ldots + \frac{k}{k^2+1} + \ldots$

18. $\displaystyle\sum_{k=0}^{\infty} \frac{1}{(k+1)\sqrt{k+1}}$

    Leibnitz test

19. $\displaystyle\sum_{k=1}^{\infty} \frac{(-1)^{k+1}}{k!}$

20. $\displaystyle\sum_{k=0}^{\infty} (-1)^k \frac{k}{k+1}$

21. $\displaystyle\sum_{k=0}^{\infty} \frac{(-1)^k}{\ln(k+2)}$