

Series — extra problems

1. Let $s_n = \frac{1 + 2e^{2n}}{3e^n + 5e^{2n}}$ be the sequence of partial sums for the series $\sum_{n=1}^{\infty} a_n$.

(a) Compute $\lim_{n \rightarrow \infty} s_n$.

(b) Does $\sum_{n=1}^{\infty} a_n$ converge or diverge? If it converges, what does it converge to?

Determine whether the series converges or diverges:

2. $\sum_{k=0}^{\infty} \left(\frac{2}{e}\right)^k$

3. $\sum_{n=1}^{\infty} \frac{3n^2 - n}{7n^2 + 45}$

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

5. $\sum_{n=0}^{\infty} (-1)^n$

6. $\sum_{n=0}^{\infty} \frac{1+x}{x^3}$

Determine if the series converges or diverges. If it converges, **compute the sum of the series**:

7. $\sum_{m=0}^{\infty} \left(\frac{3}{7}\right)^{m+1}$

8. $\sum_{n=1}^{\infty} \left(\frac{-2}{5}\right)^n$

9. $\sum_{n=0}^{\infty} \frac{5^{n-1}}{9^n}$