

Geometric and Telescoping Series- HW Problems

Determine if the following geometric series converge or diverge. If they converge find the sum.

1. $\sum_{n=1}^{\infty} \frac{1}{3^n}$

2. $1 - \frac{1}{4} + \frac{1}{16} - \frac{1}{64} + \dots$

3. $\sum_{n=1}^{\infty} \frac{e^n}{2^n}$

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

Determine if the following series are convergent or divergent. If it's convergent find the sum.

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

6. $\sum_{n=1}^{\infty} \frac{2 + 4^{n+1}}{8^n}$

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

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

9. $\frac{1}{2} + \frac{1}{4} + \frac{1}{6} + \frac{1}{8} + \frac{1}{10} + \dots$

Find the sum of the following telescoping series.

10. $\sum_{n=1}^{\infty} \frac{1}{n^2+2n}$

11. $\sum_{n=2}^{\infty} \frac{1}{n^2-1}$