

## Sequences and Series

1. Determine whether the series  $\sum_{n=1}^{\infty} \frac{n-1}{n}$  is convergent or divergent?

2. Determine whether the series  $\sum_{n=1}^{\infty} \frac{e^n + n}{e^n + 1}$  is convergent or divergent?

3. Determine whether the series  $\sum_{n=1}^{\infty} \frac{1}{n^2}$  is convergent or divergent? If it is convergent what is the sum?

4. Determine whether the series  $\sum_{n=1}^{\infty} \frac{1}{n}$  is convergent or divergent? If it is convergent what is the sum?

5. For what values of  $p$  does the sequence  $\sum_{n=1}^{\infty} \frac{1}{n^p}$  converge?

6. Approximate the sum of the series  $\sum_{n=1}^{\infty} \frac{1}{n^3}$  by using the sum of the first 10 terms. Estimate the error involved in this approximation. How many terms are required to ensure that the sum is accurate to within 0.0005?

7. Is the series  $\sum_{n=1}^{\infty} \frac{\ln(n)}{n}$  convergent or divergent? How about the series  $\sum_{n=1}^{\infty} \frac{\ln(n)}{n^2}$ ?

8. Determine whether the series  $\sum_{n=1}^{\infty} \frac{1}{n^3} + \frac{1}{\pi^n}$  is convergent or divergent?

9. Determine whether the series  $\sum_{n=1}^{\infty} \frac{1}{n} - \frac{1}{n+1}$  is convergent or divergent?