11.3:

37. (a) Use the sum of the first 10 terms to estimate the sum of the series $\sum_{n=1}^{\infty} 1/n^2$. How good is this estimate?
(b) Improve this estimate using [3] with $n = 10$.
(c) Compare your estimate in part (b) with the exact value given in Exercise 34.
(d) Find a value of n that will ensure that the error in the approximation $s \approx s_n$ is less than 0.001.

Background for #37:

34. Leonhard Euler was able to calculate the exact sum of the p-series with $p = 2$:

$$\zeta(2) = \sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$$

Use this fact to find the sum of each series.

(a) $\sum_{n=2}^{\infty} \frac{1}{n^2}$ (b) $\sum_{n=3}^{\infty} \frac{1}{(n+1)^2}$

(c) $\sum_{n=1}^{\infty} \frac{1}{(2n)^2}$

39. Estimate $\sum_{n=1}^{\infty} (2n + 1)^{-6}$ correct to five decimal places.

11.4:

Use the sum of the first 10 terms to approximate the sum of the series. Estimate the error.

35. $\sum_{n=1}^{\infty} 5^{-n} \cos^2 n$ **36.** $\sum_{n=1}^{\infty} \frac{1}{3^n + 4^n}$

11.5:

Show that the series is convergent. How many terms of the series do we need to add in order to find the sum to the indicated accuracy?

25. $\displaystyle\sum_{n=0}^{\infty} \frac{(-1)^n}{10^n n!} \quad (|\text{error}| < 0.000005)$

Approximate the sum of the series correct to four decimal places.

27. $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{(2n)!}$