

Unit 3.4 Supplemented Practice Problems

In each of the following problems a convergent alternating series is given. Because these series converge, it makes sense to estimate them which is what you will be asked to do. If a series diverges, then any partial sum estimate would be useless as you wouldn't be estimating anything.

[1] Consider the sum given by $\sum_{n=1}^{\infty} \frac{(-1)^n}{n^2 + n + 1}$

- a) Use your calculator to estimate the sum of this series using S_{10} .
- b) Is the estimate obtained in part a an under- or over-estimate?
- c) Use the inequality for the remainder of an alternating series to obtain an upper bound for the error in using S_{10} to estimate the sum.
- d) Use the answers to parts b and c to obtain an interval that the sum lies in.

[2] Consider the sum given by $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{\sqrt{n}}$

- a) Use your calculator to estimate the sum of this series using S_{20} .
- b) Is the estimate obtained in part a an under- or over-estimate?
- c) Use the inequality for the remainder of an alternating series to obtain an upper bound for the error in using S_{20} to estimate the sum.
- d) Use the answers to parts b and c to obtain an interval that the sum lies in.