

## Exercise 1

In the expansion  $1 = \sum_{n \text{ odd}} (4/n\pi) \sin nx$ , (typo: should be  $x$ , not  $\pi$ ) valid for  $0 < x < \pi$ , put  $x = \pi/4$  to calculate the sum

$$\left(1 - \frac{1}{5} + \frac{1}{9} - \frac{1}{13} + \cdots\right) + \left(\frac{1}{3} - \frac{1}{7} + \frac{1}{11} - \frac{1}{15} + \cdots\right) = 1 + \frac{1}{3} - \frac{1}{5} - \frac{1}{7} + \frac{1}{9} + \cdots$$

(*Hint:* Since each of the series converges, they can be combined as indicated. However, they cannot be arbitrarily rearranged because they are only conditionally, not absolutely, convergent.)