

1. $\sum_{i=1}^{40} \frac{1}{2i-1}$

Solution We have

$$\sum_{i=1}^{40} \frac{1}{2i-1} = \frac{1}{1} + \frac{1}{3} + \frac{1}{5} + \frac{1}{7} + \cdots + \frac{1}{79}.$$

The calculator says that the value is approximately 2.8262.

2. $\sum_{n=0}^{10} \frac{n^2}{2^n}$

Solution: We have

$$\sum_{n=0}^{10} \frac{n^2}{2^n} = 0 + \frac{1}{2} + \frac{4}{4} + \frac{9}{8} + \frac{16}{16} + \frac{25}{32} + \cdots + \frac{100}{1024}.$$

The calculator says that the sum is approximately 5.8574

3. $\sum_{k=1}^{100} \frac{(-1)^{k+1}}{k}$

Solution: We have

$$\sum_{k=1}^{100} \frac{(-1)^{k+1}}{k} = \frac{1}{1} - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \cdots - \frac{1}{100}.$$

The calculator says that the sum is approximately 0.68817.

4. $\sum_{j=0}^{20} \frac{j^2 \sin\left(\frac{\pi j}{2}\right)}{3^j}$

Solution: We have

$$\sum_{j=0}^{20} \frac{j^2 \sin\left(\frac{\pi j}{2}\right)}{3^j} = 0 + \frac{1}{3} + 0 - \frac{9}{27} + 0 + \frac{25}{243} + \cdots - \frac{19^2}{3^{19}} + 0.$$

The calculator says that the sum is approximately 0.08400

$$5. \sum_{i=1}^{100} \frac{1600}{40000 + (2i - 1)^2}$$

Solution: We have

$$\sum_{i=1}^{100} \frac{1600}{40000 + (2i - 1)^2} = \frac{1600}{40001} + \frac{1600}{40009} + \frac{1600}{40025} + \frac{1600}{40049} + \cdots + \frac{1600}{79601}.$$

The calculator says that the sum is approximately 3.1416.