Section 1: Definitions and notation

Exercise level 2

1. Write each of the following series in the form $\sum_{1}^{n} a_k$.

   (i) $2 + 4 + 6 + \ldots + 20$
   (ii) $1 + 4 + 9 + \ldots + 144$
   (iii) $1+\frac{1}{2}+\frac{1}{3}+\ldots+\frac{1}{20}$
   (iv) $1 - 2 + 4 - 8 + \ldots + 64$

2. Find

   (i) $\sum_{1}^{5}(2k+1)$

   (ii) $\sum_{1}^{4}k^2$

   (iii) $\sum_{0}^{4}2^k$

3. Write out fully:

   (i) $\sum_{1}^{6}(2k^2-1)$

   (ii) $\sum_{1}^{5}r^2-\sum_{0}^{3}\frac{r}{r+1}$

   (iii) $\sum_{0}^{4}(2k+1)-\sum_{0}^{4}(2k-1)$

   (iv) $\sum_{1}^{5}r^2+\sum_{1}^{5}(2r+1)$

4. Explain how your results in 3 (iii) and 3 (iv) could have been found more directly by simplifying the summations.