Summary of key points

1 To find the sum of a series of constant terms you can use the formula $\sum_{r=1}^{n} \mathbf{1} = n$.

2 The formula for the sum of the first n natural numbers is $\sum_{r=1}^{n} r = \frac{1}{2}n(n+1)$.

3 To find the sum of a series that does not start at $r = 1$, use $\sum_{r=k}^{n} \mathbf{f}(r) = \sum_{r=1}^{n} \mathbf{f}(r) - \sum_{r=1}^{k-1} \mathbf{f}(r)$

4 You can rearrange expressions involving sigma notation.

- $\sum_{r=1}^{n} k\mathbf{f}(r) = k\sum_{r=1}^{n} \mathbf{f}(r)$
- $\sum_{r=1}^{n} (\mathbf{f}(r) + \mathbf{g}(r)) = \sum_{r=1}^{n} \mathbf{f}(r) + \sum_{r=1}^{n} \mathbf{g}(r)$

5 The formula for the sum of the squares of the first n natural numbers is

$$\sum_{r=1}^{n} r^2 = \frac{1}{6}n(n+1)(2n+1)$$

6 The formula for the sum of the cubes of the first n natural numbers is

$$\sum_{r=1}^{n} r^3 = \frac{1}{4}n^2(n+1)^2$$