

Section 1: Summing series

Exercise level 2

1. Find

(i) $\sum_{r=30}^{50} (r^3 - 2)$ (ii) $\sum_{r=10}^{20} r(r-2)$

2. Using the standard results, find an expression for $\sum_{r=1}^n (r+1)(2r+1)$ and hence evaluate $2 \times 3 + 3 \times 5 + 4 \times 7 + \dots + 21 \times 41$.

3. Using the standard results, find the sum of the first n terms of $(r+4)^3$.

4. Write down an expression for the r th term of the series

$$1 \times 2 + 3 \times 4 + 5 \times 6 + \dots$$

and hence find the sum of the first n terms.

5. Using the standard result for $\sum_1^n r^3$, show that $\sum_{r=n+1}^{2n} r^3 = \frac{n^2(3n+1)(5n+3)}{4}$.