

Section 1: Summing series

Exercise level 1

1. Find

(i) $\sum_{r=1}^{20} 5$

(ii) $\sum_{r=1}^{100} r$

(iii) $\sum_{r=1}^{50} r^2$

(iv) $\sum_{r=1}^{20} r^3$

2. Find

(i) $\sum_{r=1}^{20} (2r^2 - 1)$

(ii) $\sum_{r=1}^{10} r(r-1)^2$

3. Find expressions for

(i) $\sum_{r=1}^n (2r - 1)$

(ii) $\sum_{r=1}^n r(3r + 1)$

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

(iv) $\sum_{r=1}^n (4r^3 - 6r^2 + 4r - 1)$

4. Using the standard results, find the sum of the first n terms of $\sum_{r=1}^n r(r+1)$.

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

6. Using the standard results, find the sum of the first n terms of the series $(2 \times 3) + (3 \times 4) + (4 \times 5) + \dots + (n + 1)(n + 2)$.