

Series 1: Standard Results

$$\sum_{r=1}^n 1 = n$$

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

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

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

Show that
$$\sum_{r=1}^n r(r+3)(2r-1) = \frac{1}{6}n(n+1)(3n^2 + an + b)$$

Where a and b are integers to be found.

Hence calculate
$$\sum_{r=11}^{40} r(r+3)(2r-1)$$

Exercise – Bk 1, p 51 Q3 to 11