S_n is defined by $\displaystyle\sum_{r=1}^{n}\left(r^2+\frac{1}{3}r\right)$.

(a) Find an expression for S_n, fully factorising your answer.   **2**

(b) Hence find an expression for $\displaystyle\sum_{r=10}^{2p}\left(r^2+\frac{1}{3}r\right)$ where $p>5$.   **2**

Answers:

(a) $\dfrac{n(n+1)^2}{3}$

(b) $\dfrac{2p(2p+1)^2}{3}-300$