2. (a) Use the standard results for summations to show that for all positive integers n

$$\sum_{r=1}^{n} r(r-1)^2 \equiv \frac{1}{12} n(n+1)(n-1)(an+b)$$

where a and b are integers to be determined.

(5)

(b) Hence determine the value of n that satisfies

$$\sum_{r=1}^{n} r(r-1)^2 = \sum_{r=1}^{n} 5r$$

(4)