7. **In this question use the standard results for summations.**

(a) Show that for all positive integers n

$$\sum_{r=1}^{n}(12r^2 + 2r - 3) = An^3 + Bn^2$$

where A and B are integers to be determined.

(4)

(b) Hence determine the value of n for which

$$\sum_{r=1}^{2n} r^3 - \sum_{r=1}^{n}(12r^2 + 2r - 3) = 270$$

(4)

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Question 7 continued

(Total for Question 7 is 8 marks)