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

$$\sum_{r=1}^{n}(2r-3)(3r+2)=\frac{1}{2}n\left(an^2+bn+c\right)$$

where a, b and c are integers to be determined.

(4)

(b) Using the answer to part (a) and making your method clear, determine the value of

$$21 \times 38 + 23 \times 41 + 25 \times 44 + \ldots + 97 \times 152$$

(2)

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Question 3 continued

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Question 3 continued

(Total for Question 3 is 6 marks)