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3. (a) Use the standard results for $\sum_{r=1}^{n} r^2$ and $\sum_{r=1}^{n} r^3$ to show that for all positive integers n

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

(4)

(b) Hence calculate the value of $\sum_{r=10}^{25} r^2 (2r + 3)$

(2)

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Question 3 continued

Q3

(Total 6 marks)