Question 3 (25 marks)

(a) Prove, by induction, that the sum of the first n natural numbers,
$1+2+3+\cdots+n,$ is $\dfrac{n(n+1)}{2}.$

(b) Hence, or otherwise, prove that the sum of the first n even natural numbers,
$2+4+6+\cdots+2n,$ is $n^2+n.$

(c) Using the results from **(a)** and **(b)** above, find an expression for the sum of the first n odd natural numbers in its simplest form.

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