

STEP III, 2018, Q2 EC

Question 2

With about 89% attempting this, it was the second most popular question, and with a mean score of nearly 11/20, the second most successful. Part (i) was generally well-handled, and although most scored some marks on the proof by induction in part (ii), candidates often struggled to complete it, many of them because they attempted to use the original definition of the functions, which rarely led to success, rather than employ the result of part (i). Some candidates noticed that the proof by induction in part (ii) was equivalent to proving $\frac{dy_n}{dx} = 2ny_{n-1}$ by induction. This gave them a simpler base case but did not significantly simplify the inductive step. For the deduction in part (ii), it was very common for the first result of part (ii) to be squared, leading to pages of algebra, although they were often then successful. Part (iii) was surprisingly poorly attempted as few candidates realised that a proof by induction (or equivalent) was required.



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