

STEP II, 2009, Q11 EC

Q11 This question was the least popular question on the paper, and those trying it averaged only 6 marks on it. The most surprising aspect of it is that so few could even write a decent *N2L* statement to begin with, and they simply stood no chance thereafter. For those who made it to the first-order, variables-separable differential equation, the work was much more promising, though I suspect this is due to the fact that only the very able made it this far. The unpromising integration of $f(v) dv$, where the $f(v)$ turned out to be a linear-over-linear algebraic fraction, was certainly unappealing to look at, but a simple substitution such as $s = P - (n + 1)Rv$ reduces it to a very simple piece of integration. As far as I recall it, most of the inequalities in (i) were fudged, though it was very heart-warming indeed to see those excellent few who made it right to the end. It is a pity that a last minute change to the question, prior to printing, which had been intended to help candidates by giving them the final answer, then omitted the factor $(n + 1)$ in its denominator. Fortunately, we are talking about no more than twenty of the most able (and high-scoring) candidates here; those who had explained it correctly, but then crossed-out the $(n + 1)$ since it didn't appear on the question-paper, were given the final mark. As for those who were slightly less honest and gave the proper explanation but (presumably deliberately) didn't write the missing factor in anywhere, in order to fudge it, we were mean and didn't give them the final mark.



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