

STEP II, 2006, Q14 EC

- 14 This was a relatively popular choice of question, perhaps partially because it started off with a couple of bits of Pure Maths: namely, curve-sketching and integration. Strangely, though, very few sketches were fully correct, even when followed-through by “reciprocating” a correct sketch of $y = x \ln x$.

Further progress was going to be impossible without integrating $\frac{1}{x \ln x}$, and some attempts fell at this hurdle. Pleasingly, several candidates spotted the log. form immediately, while many others correctly used the substitution $u = \ln x$, or equivalent.

Thereafter, it was a routine statistical exercise in some respects. However, the log. work required to simplify matters in (i) proved beyond rather too many candidates – whereas it proved much less of a difficulty in (ii). Only a few candidates realised that there was a standard series expansion ready to hand for $\ln\left(\frac{4}{3}\right)$, and those that did generally only went up to the cubed term, which was a shame as the given answer arose from using the next one as well.

The final twist, in part (iv), of giving a range that turned out to be outside the non-zero part of the *pdf*, was twigged by slightly more than half of the candidates that got this far.



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