

STEP II, 2024, Q2 EC

Question 2

This question was attempted by approximately three-quarters of the candidates and many very good solutions were seen.

In part (i) candidates were generally able to find the binomial series expansion, but some did not give a clear enough statement of the general term. A number of candidates did not recognize that it would be possible to use the series expansion to establish the integration result that was required and instead attempted to use integration by parts or to produce a proof by induction.

Most candidates recognized the way in which part (i) could be applied to answer part (ii) and this part was generally answered well. A number of candidates forgot to evaluate the integral before moving on to the next part of the question.

In part (iii) a large number of candidates recognized that the use of partial fractions would allow them to apply part (i) again, but many did not then realise that there was a need for partial fractions to be applied a second time. Almost all candidates who reached the final integral were able to recognize it and either state the answer or use an appropriate substitution.



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