

STEP III, 2015 , Q13 EC

13. The large majority of attempts got almost no marks, and as a consequence this was the second worst scoring question. A lot failed to draw the right sort of graph to attempt the first part of (i) or, if they did, frequently miscalculated the area to find $P(X + Y < t)$ in the case $1 < t \leq 2$. The next major problem was an inability to see how to find the cumulative distribution function of $(X + Y)^{-1}$. A surprisingly large number failed to multiply by t before integrating to find the expectation. A handful of candidates got most of the question right although only one made it clear with a symmetry argument why they could write down $E\left(\frac{X}{X+Y}\right) = \frac{1}{2}$.



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