

STEP II, 2013, Q12 MS

Question 12.

The formula for the expectation of a random variable should be well known and both of the expectations can easily be written in terms of α and β .

Similarly, the formula for variance should be well known and so it is a matter of rearranging the sums in such a way as to reach the forms given in the question. Note that the definitions of α and β are such that $e^\lambda = \alpha + \beta$.

Since the $Var(X + Y) = Var(U)$ the equation in the final part of the question can be rewritten in terms of the variables defined at the start of the question. It can then be shown that this is not possible for any non-zero value of λ .



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