1. (the Exchange Paradox)
   1. Given we know that the amount of money put in envelope 1 is m, then the probability of you finding m or 2m dollars in your envelope is X, so given we know m we can write the probability of X as:

Now if we try to determine the probability of M’s value based on X we can describe that as:

We can use this too write the probability of getting x vs when trading as the odds between the two outcomes:

Given all this we will let Y stand for the amount of money in our opponent’s envelope. So we need an equation for the expected value of Y given you know X:

* 1. S
  2. s

1. (practice with joint, marginal and conditional densities)
   1. S
   2. S
   3. S
   4. S
      1. The marginal distribution for y1 is:

The marginal distribution for y2 is:

* + 1. s
  1. They are dependent for two reasons, first because the support requires y2 is less than y1 and second if you multiply the two marginals distributions you don’t get the joint distribution:
  2. s

1. (moment-generating functions)
   1. D
   2. K
      1. We know that and the MGF of a discrete random variable is: . So given all this the MGF for the discrete random variable Y is: now we have to use the knowledge that and say that giving us:
      2. [NOTE] skewness(Y) =
   3. D
   4. D
   5. d
2. (archaeology)
   1. D
   2. D
   3. d