10. Exercise: Binomial probabilities

Exercises due Feb 19, 2020 05:29 IST *Completed*

Exercise: Binomial probabilities

2.0/2.0 points (graded)

Recall that the probability of obtaining k Heads in n independent coin tosses is $\binom{n}{k}p^k(1-p)^{n-k}$, where p is the probability of Heads for any given coin toss.

Find the value of $\sum_{k=0}^{n}\binom{n}{k}p^k(1-p)^{n-k}$. (Your answer should be a number.)

1

✔ **Answer:** 1

Solution:

Note that the events “0 Heads", “1 Heads", ..., “n Heads" are disjoint, and their union is the entire sample space. The summation is adding up the probability of all of these events. Hence, the sum must be 1. In other words, each term in the summation gives the probability of obtaining k Heads out of n tosses. We then sum over all values of k, from 0 to n. Since the number of Heads must be one of $0, 1, \ldots, n$, these probabilities must sum up to 1.

Submit You have used 2 of 3 attempts

Answers are displayed within the problem

Discussion

Hide Discussion

Topic: Unit 3: Counting:Lec. 4: Counting / 10. Exercise: Binomial probabilities

Show all posts by recent activity

When in doubt.....assume values. 2
While the question does hint towards Binomial Theorem , but it didn't exactly click for me. But checking t...

Mind Blowing 3
Think about the basic theorems of probability... do not overthink!

Put this in Words 8
This question really tests your conceptual understanding and not algebra proficiency. Explain to yourself...

Knowledge of the Binomial theorem would help (mathematically) 4
In general, the binomial expression as discussed above is written as [removed by staff] here. By doing so...

If you've spent more than a minute or two 2
Think about what the question is asking in words.

mit courses are so mind bending 8 new
Every time I do an MIT course, I get so close to giving up, but then I reposition myself, often after a break...

Hint - Try and see the overall pic 1
Hint 1 - No calculation or algebra is needed to answer this , try and focus on bigger picture, what does th...

Am I the only one unable to get the intuition or concrete theory? 4
For this question and the previous one I can't grasp the intuition at all and trying to brute force an answ...

? single number ? 2 new 16
How could we get a number since n and p are unknown ?

Intuition all the time 2 new
This course is mindblowing one and the fact that all the time intuition is emphasized and we are given c...

? Why not teach Binomial theorem more explicitly? 3
I looked up a proof for this question, and I arrived at the [Binomial Theorem 1-liner proof][1]. Then, I loo...