12. Exercise: More properties

Exercises due Feb 5, 2020 05:29 IST   *Completed*

Exercise: More properties

2/2 points (graded)

Let A, B, and C be subsets of the sample space, not necessarily disjoint. For each one of the following statements, determine whether it is true or false. *Note:* "False" means "not guaranteed to be true."

a) $\mathbf{P}\big((A \cap B) \cup (C \cap A^c)\big) \leq \mathbf{P}\left(A \cup B \cup C\right)$

| True   ✔ | ✔ **Answer: True**

b) $\mathbf{P}\left(A \cup B \cup C\right) = \mathbf{P}\left(A \cap C^c\right) + \mathbf{P}\left(C\right) + \mathbf{P}\left(B \cap A^c \cap C^c\right)$

| True   ✔ | ✔ **Answer: True**

Solution:

a) True. This is because the set $(A \cap B) \cup (C \cap A^c)$ is a subset of $A \cup B \cup C$.

b) True. This is the same property shown in the last segment, with the three sets appearing in a different order.
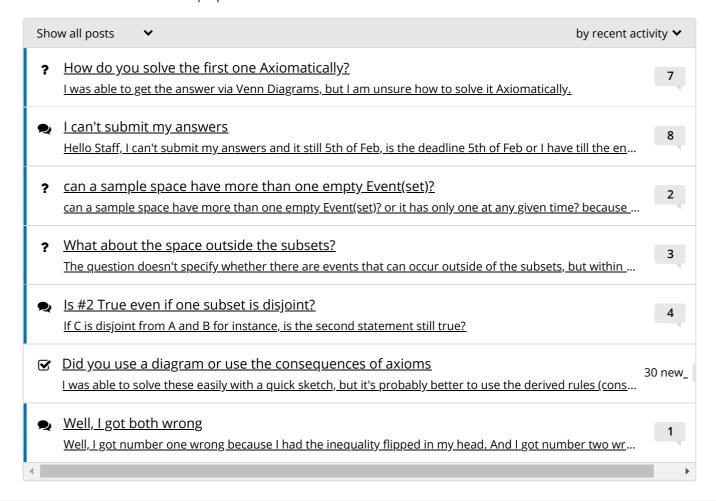
Submit   You have used 1 of 1 attempt

ⓘ Answers are displayed within the problem

Discussion

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? <u>How do you solve the first one Axiomatically?</u>   7
      <u>I was able to get the answer via Venn Diagrams, but I am unsure how to solve it Axiomatically.</u>

💬 <u>I can't submit my answers</u>   8
      <u>Hello Staff, I can't submit my answers and it still 5th of Feb, is the deadline 5th of Feb or I have till the en</u>...

? <u>can a sample space have more than one empty Event(set)?</u>   2
      <u>can a sample space have more than one empty Event(set)? or it has only one at any given time? because</u> ...

? <u>What about the space outside the subsets?</u>   3
      <u>The question doesn't specify whether there are events that can occur outside of the subsets, but within</u> ...

💬 <u>Is #2 True even if one subset is disjoint?</u>   4
      <u>If C is disjoint from A and B for instance, is the second statement still true?</u>

☑ <u>Did you use a diagram or use the consequences of axioms</u>   30 new
      <u>I was able to solve these easily with a quick sketch, but it's probably better to use the derived rules (cons</u>...

💬 <u>Well, I got both wrong</u>   1
      <u>Well, I got number one wrong because I had the inequality flipped in my head. And I got number two wr</u>...