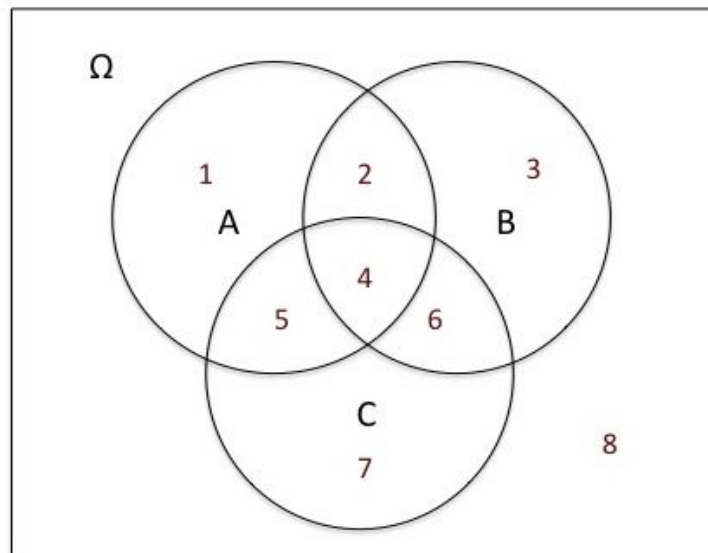# 1. Venn diagrams

Problem Set due Feb 5, 2020 05:29 IST   *Completed*

Problem 1. Venn diagrams

5.0/5.0 points (graded)

In this problem, you are given descriptions in words of certain events (e.g., "at least one of the events A, B, C occurs"). For each one of these descriptions, identify the correct symbolic description in terms of A, B, C from Events E1-E7 below. Also identify the correct description in terms of regions (i.e., subsets of the sample space Ω) as depicted in the Venn diagram below. (For example, Region 1 is the part of A outside of B and C.)

Symbolic descriptions:

- Event E1: $A \cap B \cap C$

- Event E2: $(A \cap B \cap C)^c$

- Event E3: $A \cap B \cap C^c$

- Event E4: $B \cup (B^c \cap C^c)$

- Event E5: $A^c \cap B^c \cap C^c$

- Event E6: $(A \cap B) \cup (A \cap C) \cup (B \cap C)$

- Event E7: $(A \cap B^c \cap C^c) \cup (A^c \cap B \cap C^c) \cup (A^c \cap B^c \cap C)$

  1. At least two of the events A, B, C occur.

     Event E6   ✔ **Answer:** Event E6

     Regions: 2 4 5 6   ✔ **Answer:** Regions: 2 4 5 6

  2. At most two of the events A, B, C occur.

     Event E2   ✔ **Answer:** Event E2

     Regions: 1 2 3 5 6 7 8   ✔ **Answer:** Regions: 1 2 3 5 6 7 8

  3. None of the events A, B, C occurs.

     Event E5   ✔ **Answer:** Event E5

     Region: 8   ✔ **Answer:** Region: 8

  4. All three events A, B, C occur.

     Event E1   ✔ **Answer:** Event E1

     Region: 4   ✔ **Answer:** Region: 4

  5. Exactly one of the events A, B, C occurs.

     Event E7   ✔ **Answer:** Event E7

Regions: 1 3 7   ✔ **Answer:** Regions: 1 3 7

6. Events A and B occur, but C does not occur.

Event E3   ✔ **Answer:** Event E3

Region: 2   ✔ **Answer:** Region: 2

7. Either (i) event B occurs, or (ii) neither B or C occurs.
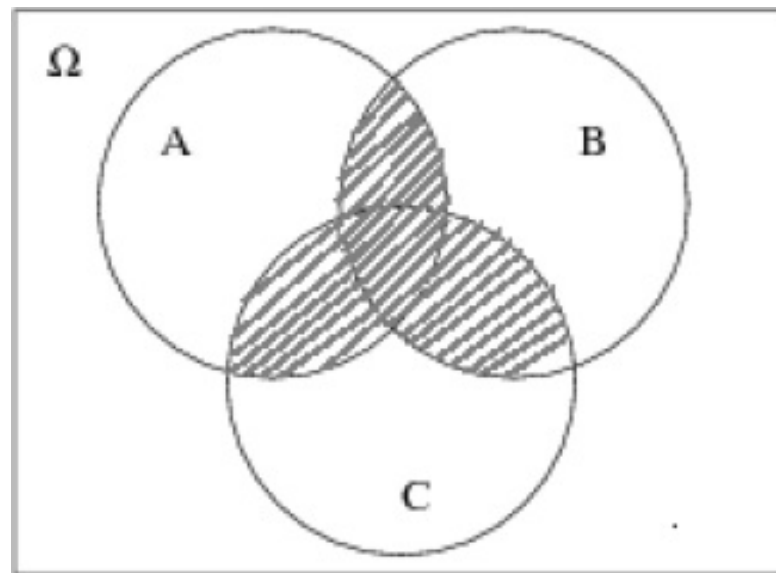
Event E4   ✔ **Answer:** Event E4

Regions: 1 2 3 4 6 8   ✔ **Answer:** Regions: 1 2 3 4 6 8

Solution:

1. At least two of the events A, B, C occur:
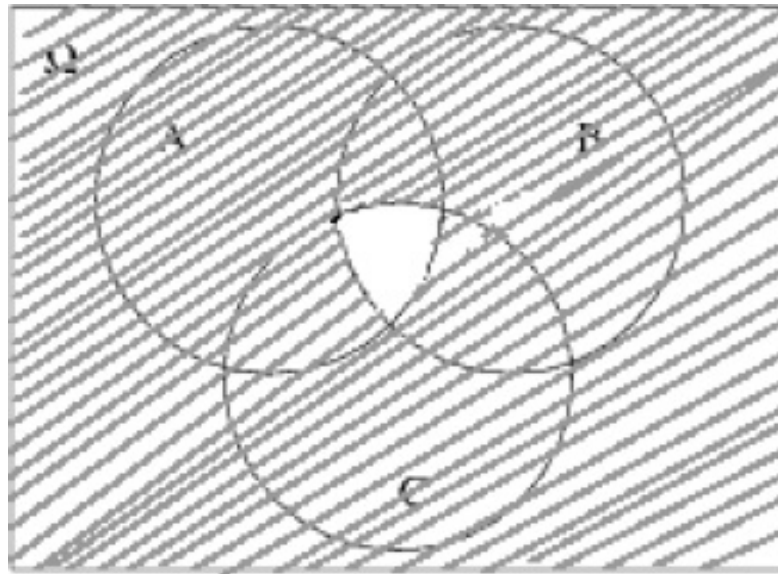 $(A \cap B) \cup (A \cap C) \cup (B \cap C)$

(a)

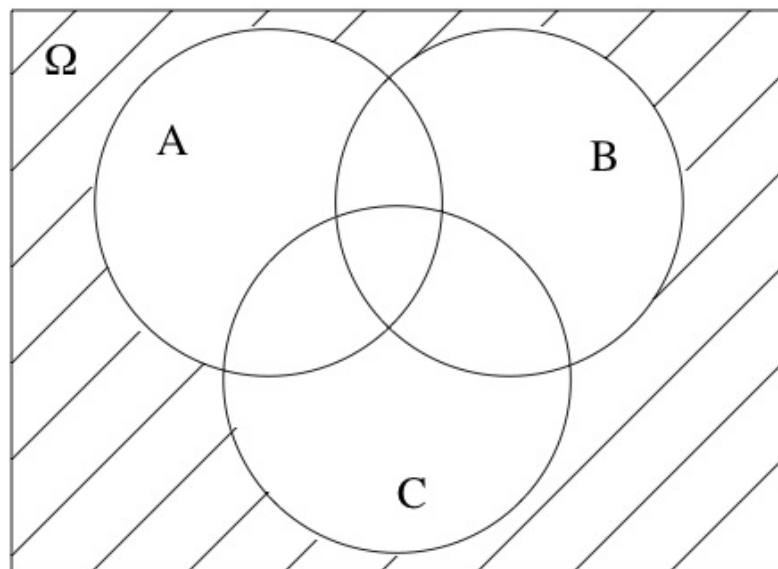2. At most two of the events A, B, C occur:
   $(A \cap B \cap C)^c$

(b)

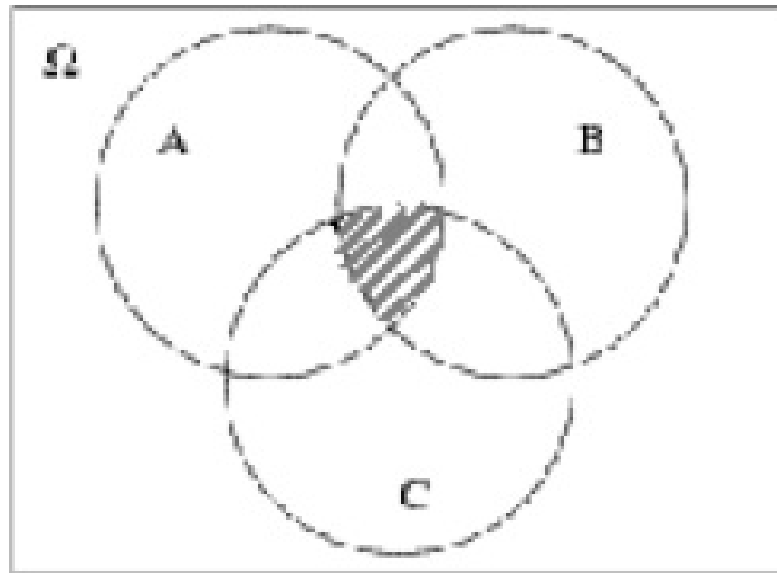3. None of the events A, B, C occurs:
$$A^c \cap B^c \cap C^c$$

(c)

4. All three events A, B, C occur:
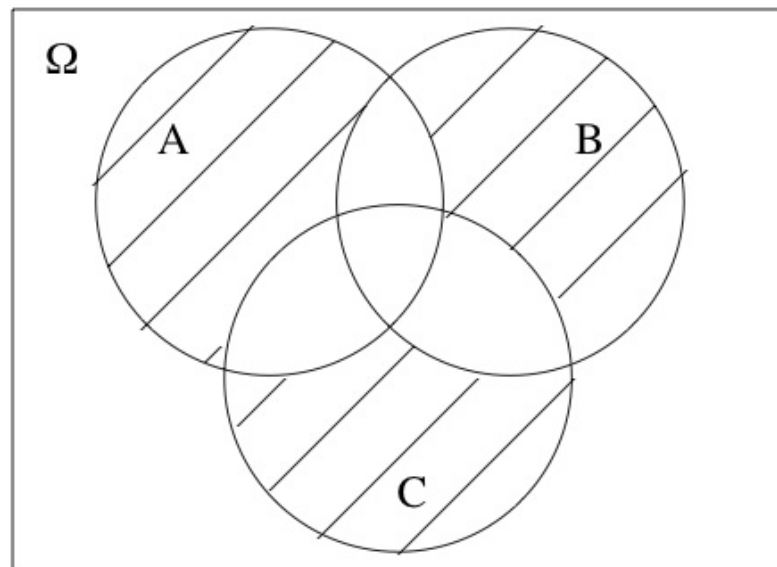 $A \cap B \cap C$

(d)

5. Exactly one of the events A, B, C occurs:
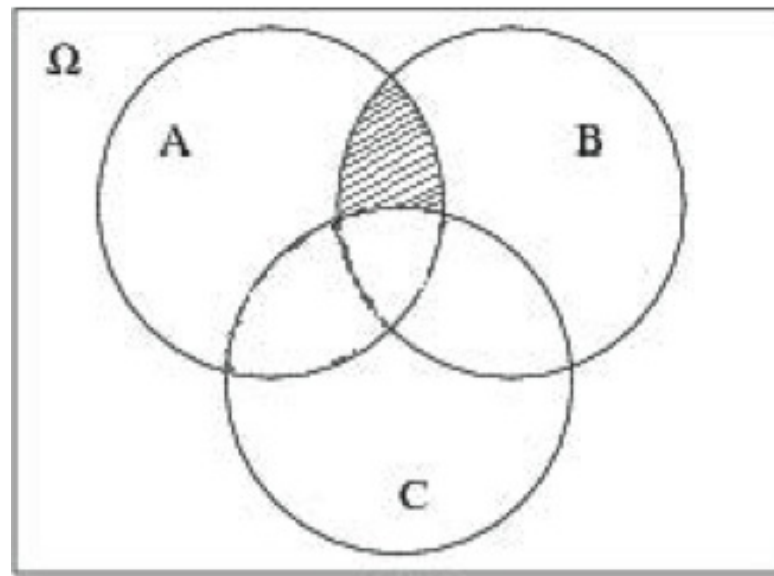 $(A \cap B^c \cap C^c) \cup (A^c \cap B \cap C^c) \cup (A^c \cap B^c \cap C)$

(e)

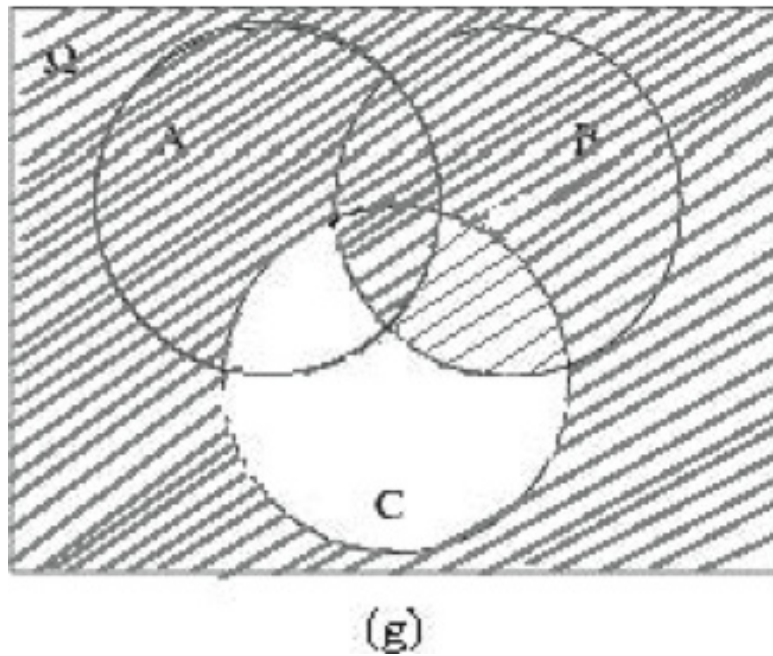6. Events A and B occur, but C does not occur:
   $A \cap B \cap C^c$

(f)

7. Either event B occurs or, if not, then C also does not occur:
   $B \cup (B^c \cap C^c)$

(g)

Submit   You have used 1 of 3 attempts

ℹ Answers are displayed within the problem

Discussion

Topic: Unit 1: Probability models and axioms:Problem Set 1 / 1. Venn diagrams

Show all posts ▾	by recent activity ▾

💬 **All correct!**
To me, the easiest way to understand the different events was coulouring them in a blank one. I unde...
1

❓ **one of the events means???**
one of the events means??? anyone describe clearly?? confused this ..
3

💬 **I got regions of 7 by a process of elimination...**
...but I'll be dipped if I understand why it isn't something else. Everything else was straightforward.
3

❓ **At most two of the events - clarification pls**
At most two of the events A,B,C occur; I understood this as AUB + AUC + BUC. I did not think that the...

Unable to Understand Diagram for Problem 7

I'm finding it difficult to picture problem 7 and the diagram doesn't make sense to me. It says: Either ...

2

Submit Button Not Showing

Hi, I saved my answers so that I could research further. I have gone back to submit, but the Submit b...

16

Wrong deadline in my Edx screen

Hello, the deadline of the first problem set was shown with the deadline Feb 5 07:59CST instead of Fe...

4

Due Date

Hi all. On my dashboard it says that the Unit 1 Problem Set and practice problems are due today, 2/4....

10

Cannot submit

I am trying to submit answers but I am unable to.

8

Whats means that an event occur ?

for example, for A to occur, is it necessary for {1,2,4,5} to occur? I'm confused, can someone please cl...

3

Event 4 might be wrong

I believe there is a mistake in Event 4. It should be changed to: BU(B'UC')

1 new 5

Not Submitting

Hello, Submit button is not working. Do I need to be on the verified track to be able to submit my ans...

2

Submitted twice accidentally.

Dear Staff: I got all the answers correct in the first attempt but accidentally clicked "Save" after they h...

6 new