Question 1

(1/1 point)

For events A and B in S, which of the following formulas correspond to the probability that either A or B, but not both, occur? (Select all that apply)

- [ ] a. P(A)+P(B)-P(A∩B)
- [x] b. P(A)+P(B)-2*P(A∩B) ✔
- [ ] c. P(A)+P(B)
- [x] d. (P(A)- P(A∩B)) +(P(B)- P(A∩B)) ✔
- [x] e. $P(A \cap B^C)+ P(A^C \cap B)$ ✔

✔

EXPLANATION

- Exit Survey

If A occurs and B does not, this corresponds to the event $A \cap B^C$. Similarly, when B occurs and A does not, then the event that occurs is $A^C \cap B$. Since these are mutually exclusive, we can take the sum. We also have that $P(A \cap B^C)=P(A)-P(A \cap B)$ and that $P(A^C \cap B)= P(B)- P(A \cap B)$. If we add the two, we get $P(A)+P(B)-2*P(A \cap B)$.

You have used 2 of 2 submissions

Question 2

(1/1 point)
State whether the following statement is True or False:

If $P(A)=1/3$ and $P(B^C)=1/4$, A and B can be disjoint.

a. True

b. False ✔

c. From the information given it is not possible to tell

EXPLANATION

If A and B were disjoint, then we will have that P(A∪B)=P(A)+P(B). Here, we have that P(A)=1/3 and P(B)=1- P(B^C)=1-1/4=3/4. Using this information, we have that P(A)+P(B)=1/3+3/4=13/12 > 1. Thus, the statement is false.

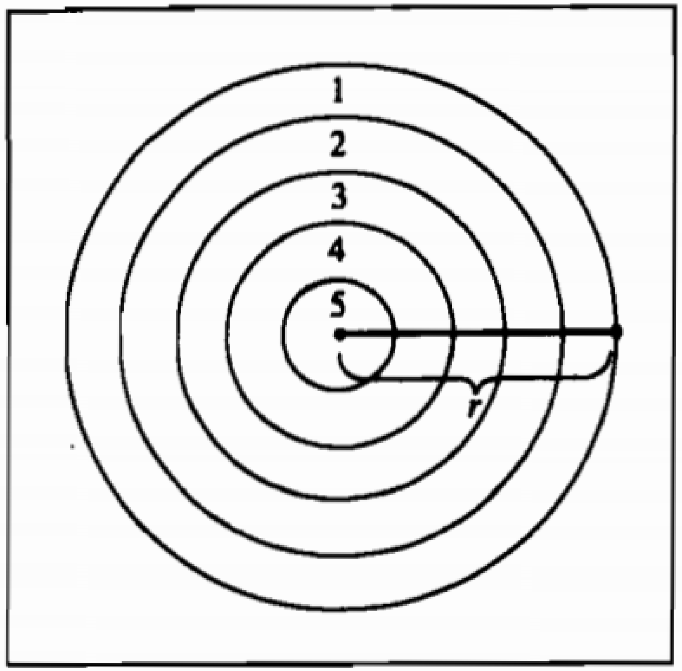
You have used 1 of 1 submissions

Question 3

(1/1 point)

Consider the following example taken from Casella Berger: A game of darts is played by throwing a dart at a board and receiving a score assigned to the region where the dart hits. Figure 1 shows the board and the different possible regions.

Figure 1:



Assume that you are a novice player and that a friend suggests that the probability of you scoring i points is given by the following formula: $P(scoring\ i\ points) = \frac{Area\ of\ region\ i}{Area\ of\ dart\ board}$

Does this definition satisfy the definition of probability discussed by Sara during the lecture?

- a. Yes ✔
- b. No

EXPLANATION

You should be able to verify that the three conditions regarding a probability (as discussed by Sara) are satisfied. First, since for any real value there is either a region in the board or not, we have that P(scoring i) is greater or equal to zero for any i. Second if we add up all the regions i, we will get the total area of dart board. Thus, adding the probabilities will sum up to one, and so the second condition is satisfied. Third, striking each region i with the dart is a disjoint event. Therefore, we can sum the probability of scoring i, j, k points up and consequently the third condition is also satisfied.

You have used 1 of 1 submissions

Question 4

(1/1 point)
Using an alphabet of 26 letters, how many sets of initials can be formed if every person has exactly one first name and one surname (last name)?

676

Answer: 676

676

EXPLANATION

The first initial can take 26 possible values, the second one can take 26 possible values as well. Thus, the total set of initials is given by 26*26=676

You have used 1 of 2 submissions

Question 5

(1/1 point)

In the game of dominoes, each piece is marked with two numbers. The pieces are symmetrical so that the numbered pair is not ordered: this means that (2,6) = (6,2). How many pieces can be formed with different numbers using the numbers 1, 2, ..., n?

- $\frac{2n}{n+1}$
- $\frac{n(n+1)}{2}$ ✔
- $\frac{n(n-1)}{2}$ ✔
- $n(n+1)$

EXPLANATION

The number of pieces with different numbers is equal to n choose 2. Then, the total pieces with different numbers is $\frac{n(n-1)}{2}$. There are n additional pieces with the same number. Thus, the total is: $n + \frac{n(n-1)}{2} = \frac{(n+1)n}{2}$.. Since there can be a misinterpretation of the wording of question we would accept $\frac{n(n-1)}{2}$ also as a valid answer.

You have used 1 of 2 submissions