Event=an outcome or defined collection of outcomes of a random experiment

DM 1st Law: (A U B)’=A’ n B’, DM 2nd Law: (A n B)=A’ U B’.

Mutually exclusive = two or more events that cannot occur at the same time. If one of the outcomes occurs, it is not possible for the other event outcome to occur.

Axiom 1: For any event A, P(A) >= 0. Axiom 2: P(Sample Space)=1. Axiom 3: If A\_1,A\_2, A\_3 is an infinite collection of disjoint events, then P(Union of all A’s)= Sum of P(a’s). P(empty set)=0.

Complement Rule: P (A) = 1 −P (A′). Addition Rule: P (A ∪B ) = P (A) + P (B ) −P (A ∩B ).

nPk= n!/(n −k )!. nCk = n!/k!(n-k)!. Condition Prob.: P (A|B ) = P (A ∩ B )/P (B ) . P (A ∩ B ) = P (A|B)P(B). P (A1 ∩ A2 ∩ A3) = P (A3|(A1 ∩ A2))P (A1 ∩ A2)= P (A3|(A1 ∩ A2))P (A1|A2)P (A2)

Bayes’ Theorem: P (A|B ) = P (B|A)P (A)/P(B)

Independent if P (A|B ) = P (A), and they are dependent otherwise. P(A ∩B) = P (A)P (B)

If AnC & AnB are independent, this does not imply that BnC are independent! Check all.

P(AnB)=P(A)+P(B) – P(AUB).. 3components P(AUBUC)= P(A)+P(B)+P(C)\_P(AnB)-P(AnC)-P(BnC)+P(AnBnC)… P(AnB’ )=P(A)-P(AnB)… P(A’nB) =P(B) – P(AnB)…

PROOFS: 1) Write all formulas you know. 2) Substitute!! 3) Look for compliments 4) When in doubt draw a Venn diagram.

If you are trying to count the number of ordered pairs/tuples of objects:

1. Define 𝑛1,𝑛2,...

2. Use the Fundamental Counting Principle (𝑛1 ×𝑛2 ×...) n

1. Define 𝑛 and 𝑘

• 𝑛 is the number of distinct objects

• 𝑘 is the number of objects selected

Table

Description automatically generated2. List out some sample space elements

3. Determine replacement: Can the 𝑛 objects can be selected more

than once per element (with replacement) or not (without

replacement)?

4. Determine order: Does the sequence of each element matter (is

{1,2,3} meaningfully different than {2,1,3})?

5. Use the box below to identify the correct counting technique

6. Remember that when you are computing a probability, you should

have the same number of things accounted for in the numerator and

the denominator.