Probability

Examples

1. What are the following terms:

   - Outcome space
   - Outcomes
   - Events
   - Random Variables
   - Discrete vs Continuous Random Variables
   - PDF/CDF
   - PMF/CDF
   - Binomial coefficient
   - Pascal's triangle
   - Binomial distribution
   - Expected value
   - Payout of a game
   - $E[X], E[X^2]$, etc.
   - Independent events

2. Let A, B be events in a probability space Ω. Suppose $P(A) = 0.15, P(B) = 0.25, A \cap B = \emptyset$. Compute: $P(\Omega \backslash B), P(B \backslash A), P(A \cup B), P(\Omega)$.

   > **Solution:** $P(\Omega \backslash B) = 1 - P(B) = 0.75$. $P(B \backslash A) = P(B) = 0.25$ since $B \backslash A = B$. $P(A \cup B) = P(A) + P(B) = 0.4$ since $A \cap B = \emptyset$. Finally $P(\Omega) = 1$.

Problems

3. **TRUE**   False   The value of a PMF at a point represents the probability of picking that number.

> **Solution:** This is true but it is **not** true for a PDF.

4. True   **FALSE** Associated to any random variable X is a PDF.

> **Solution:** Associated to a continuous random variable is a PDF, but for a discrete random variable, the PDF is replaced with a PMF.

5. Question 6, HW 23