

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: $P(\Omega \setminus B)$, $P(B \setminus A)$, $P(A \cup B)$, $P(\Omega)$.

Solution: $P(\Omega \setminus B) = 1 - P(B) = 0.75$. $P(B \setminus A) = P(B) = 0.25$ since $B \setminus A = B$.
 $P(A \cup B) = P(A) + P(B) = 0.4$ 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.