

Statistics: Review Sheet

Counting & Probability

What's the chance that numbers are used to figure this one out ?



- Compute the number of ways an event can occur whether repetitions occur or not and whether order matters or not.
- Distinguish between Classical, Empirical, and Subjective Probability.
- Determine the Probability of two Events whether they are mutually exclusive or not.
- Compute the probability for both dependent and independent events using multiplication rules.
- Know what the relationship of probabilities is with complementary events.

Vocabulary

Classical Probability
 Combination
 Complement of an Event
 Compound Event
 Conditional Probability
 Dependent Events
 Empirical Probability
 Independent Event
 Law of Large Numbers
 Mutually Exclusive Events
 Permutation
 Sample Space
 Subjective Probability
 Tree Diagram

Important Formulas

Multiplication rule for counting

$$k_1 \cdot k_2 \cdot k_3 \cdot \dots \cdot k_n$$

Permutation Rule

If a number of object are alike (repetitive)

$$= \frac{n!}{k_1! \cdot k_2! \cdot k_3! \cdot \dots \cdot k_n!}$$

Probability

For mutually exclusive events

$$P(A \text{ or } B) = P(A) + P(B)$$

Probability

For Independent events

$$P(A \text{ and } B) = P(A) \cdot P(B)$$

Permutation Rule

If order matters without repetitions

$${}_n P_r = \frac{n!}{(n - r)!}$$

Combination Rule

If order doesn't matter.

$${}_n C_r = \frac{n!}{(n - r)! r!}$$

Probability

For non-mutually exclusive events

$$P(A \text{ or } B) = P(A) + P(B) - P(A \& B)$$

Probability

For Dependent events

$$P(A \text{ and } B) = P(A) \cdot P(B|A)$$

Conditional Probability

$$P(B|A) = \frac{P(A \text{ and } B)}{P(A)}$$

Complementary Events Probability

$$P(\bar{E}) = 1 - P(E)$$