

PROBABILITY

Study Materials: Key Concepts, Practice Questions, Answers

Mathema
Contest

Probability -Study guide and Practice Questions



Name: _____

Key Concepts

1. Basic Probability

- **Probability of an Event:** The likelihood of an event occurring, denoted $P(A)$.
 - Formula: $P(A) = \frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$
- **Complementary Events:** The complement of event A is the event that A does not occur, denoted A' .
 - Formula: $P(A') = 1 - P(A)$

2. Conditional Probability

- **Conditional Probability:** The probability of event A occurring given that event B has occurred, denoted $P(A|B)$.
 - Formula: $P(A|B) = \frac{P(A \cap B)}{P(B)}$, provided $P(B) \neq 0$

3. Independent and Dependent Events

- **Independent Events:** Two events A and B are independent if the occurrence of one does not affect the occurrence of the other.
 - Formula: $P(A \cap B) = P(A) \cdot P(B)$
- **Dependent Events:** Two events A and B are dependent if the occurrence of one affects the occurrence of the other.

4. Probability Rules

- **Addition Rule:** For any two events A and B ,
 - $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
- **Multiplication Rule:** For any two events A and B ,
 - If A and B are independent: $P(A \cap B) = P(A) \cdot P(B)$
 - If A and B are dependent: $P(A \cap B) = P(A) \cdot P(B|A)$

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Practice Questions

1. Basic Probability

- A bag contains 5 red, 3 blue, and 2 green balls. What is the probability of drawing a blue ball?

2. Conditional Probability

- A card is drawn from a standard deck of 52 cards. What is the probability that it is a King, given that it is a face card?

3. Independent Events

- Two dice are rolled. What is the probability that both dice show a 6?

4. Addition Rule

- What is the probability of drawing a red card or a Queen from a standard deck of 52 cards?

Answers

1. Basic Probability

- $\frac{3}{10}$

2. Conditional Probability

- $\frac{1}{3}$

3. Independent Events

- $\frac{1}{36}$

4. Addition Rule

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- $\frac{7}{13}$