1. Which method of probability introduces the concept through observing outcomes over repeated trials?

a) Probability Axioms
b) Relative Frequency
c) Total Probability
d) Bayes' Theorem

Answer: b) Relative Frequency

Explanation: Relative frequency probability is based on observing outcomes over repeated trials and calculating the proportion of times an event occurs.

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2. What type of sample space consists of countable and distinct outcomes?

a) Discrete Sample Space
b) Continuous Sample Space
c) Mixed Sample Space
d) Finite Sample Space

Answer: a) Discrete Sample Space

Explanation: In a discrete sample space, the set of possible outcomes is countable and distinct, such as rolling a die or flipping a coin.

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3. Which of the following is an example of a continuous random variable?

a) Number of students in a class
b) Number of red balls in a bag
c) Height of individuals in a population
d) Number of cars in a parking lot

Answer: c) Height of individuals in a population

Explanation: Continuous random variables can take any value within a range, such as height, weight, or time.

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4. What are the conditions for a function to be considered a random variable?

a) It must return a unique value for each outcome.
b) It must be defined on a sample space.
c) It must assign probabilities to outcomes.
d) It must be continuous.

Answer: b) It must be defined on a sample space.

Explanation: A function is considered a random variable if it is defined on the sample space of

an experiment.

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5. What is the probability of the joint occurrence of two independent events?

a) Product of their individual probabilities
b) Sum of their individual probabilities
c) Difference of their individual probabilities
d) Ratio of their individual probabilities

Answer: a) Product of their individual probabilities

Explanation: For independent events, the probability of their joint occurrence is the product of their individual probabilities.

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6. Which theorem allows us to update our belief about an event based on new evidence?

a) Total Probability Theorem
b) Bayes' Theorem
c) Conditional Probability Theorem
d) Independence Theorem

Answer: b) Bayes' Theorem

Explanation: Bayes' Theorem allows us to update our beliefs about the probability of an event based on new evidence or information.

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7. In probability theory, what do we call events that do not influence each other's occurrence?

a) Dependent Events
b) Conditional Events
c) Joint Events
d) Independent Events

Answer: d) Independent Events

Explanation: Independent events are events whose occurrences do not influence each other.

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8. What is the sum of probabilities of all possible outcomes in a sample space?

a) Relative frequency
b) Total probability
c) Conditional probability
d) Joint probability

Answer: b) Total probability

Explanation: The sum of probabilities of all possible outcomes in a sample space is known as the total probability and must equal 1.

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9. Which type of random variable can only take on a finite or countably infinite number of distinct values?

a) Continuous Random Variable
b) Discrete Random Variable
c) Mixed Random Variable
d) Deterministic Random Variable

Answer: b) Discrete Random Variable

Explanation: Discrete random variables can only take on a finite or countably infinite number of distinct values.

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10. What is the probability of an event given that another event has already occurred?

a) Conditional Probability
b) Marginal Probability

c) Joint Probability
d) Independent Probability

Answer: a) Conditional Probability

Explanation: Conditional probability is the probability of an event occurring given that another event has already occurred.

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11. Which of the following is an example of a continuous sample space?

a) Rolling a fair six-sided die
b) Tossing a coin
c) Measuring the temperature in Celsius
d) Drawing a card from a deck

Answer: c) Measuring the temperature in Celsius

Explanation: Continuous sample spaces involve measurements that can take on any value within a range, such as temperature.

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12. What is the probability of the union of two mutually exclusive events?

a) Sum of their individual probabilities
b) Product of their individual probabilities
c) Difference of their individual probabilities
d) Zero

Answer: a) Sum of their individual probabilities

Explanation: Mutually exclusive events cannot occur simultaneously, so the probability of their union is the sum of their individual probabilities.

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13. Which axiom of probability states that the probability of any event is a real number between 0 and 1?

a) Axiom of Countable Additivity
b) Axiom of Non-Negativity
c) Axiom of Normalization
d) Axiom of Probability

Answer: b) Axiom of Non-Negativity

Explanation: The Axiom of Non-Negativity states that the probability of any event cannot be negative and must be a real number between 0 and 1.

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14. What do we call a random variable that can take on both discrete and continuous values?

a) Discrete Random Variable
b) Continuous Random Variable
c) Mixed Random Variable
d) Deterministic Random Variable

Answer: c) Mixed Random Variable

Explanation: Mixed random variables can take on both discrete and continuous values.

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15. What is the probability of an event occurring, given that another event has already occurred and changed the sample space?

a) Marginal Probability
b) Joint Probability
c) Conditional Probability
d) Total Probability

Answer: c) Conditional Probability

Explanation: Conditional probability considers the probability of an event given that another

event has already occurred and changed the sample space.

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16. Which of the following is NOT a condition for a function to be considered a random variable?

a) It must be defined on a sample space.
b) It must return a unique value for each outcome.
c) It must assign probabilities to outcomes.
d) It must be continuous.

Answer: d) It must be continuous.

Explanation: A random variable can be either discrete or continuous; it doesn’t have to be continuous.

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17. What is the probability of the complement of an event?

a) Probability of the event not occurring
b) Probability of the event occurring
c) Probability of both events occurring
d) Probability of either event occurring

Answer: a) Probability of the event not occurring

Explanation: The complement of an event consists of all outcomes not in the event, so its probability is the probability of the event not occurring.

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18. What type of sample space consists of uncountable and infinite outcomes?

a) Discrete Sample Space
b) Continuous Sample Space
c) Finite Sample Space
d) Mixed Sample Space

Answer: b) Continuous Sample Space

Explanation: Continuous sample spaces consist of uncountable and infinite outcomes, such as intervals of real numbers.

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19. Which probability theorem allows us to find the probability of an event given a partition of the sample space?

a) Total Probability Theorem
b) Bayes' Theorem

c) Joint Probability Theorem
d) Conditional Probability Theorem

Answer: a) Total Probability Theorem

Explanation: The Total Probability Theorem allows us to find the probability of an event by considering its occurrence under different partitions of the sample space.

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20. What type of random variable can only take on a single, specific value?

a) Continuous Random Variable
b) Discrete Random Variable
c) Mixed Random Variable
d) Deterministic Random Variable

Answer: d) Deterministic Random Variable

Explanation: A deterministic random variable takes on a single, specific value with certainty and does not involve randomness.