TRUE FALSE

The sum of probabilities of all possible outcomes in a sample space must equal 1.

The sum of probabilities of all possible outcomes in a sample space must equal 1.

True. This is a fundamental axiom of probability: The probabilities of all elementary events in a sample space sum to 1.

TRUE FALSE

In a probability distribution, the sum of probabilities for all possible values can be less than 1.

In a probability distribution, the sum of probabilities for all possible values can be less than 1.

False. A valid probability distribution requires that the sum of probabilities for all possible outcomes equals exactly 1.

TRUE FALSE

The sum of the probability of an event and the probability of its complement is always 1.

The sum of the probability of an event and the probability of its complement is always 1.

True. By definition, P(A) + P(not A) = 1 for any event A.

TRUE FALSE

If two events cover all possible outcomes, the sum of their probabilities must be 1.

If two events cover all possible outcomes, the sum of their probabilities must be 1.

True. Events that cover all possible outcomes are exhaustive, and their combined probabilities sum to 1.

TRUE FALSE

The sum of probabilities of all outcomes can exceed 1 if some outcomes are more likely.

The sum of probabilities of all outcomes can exceed 1 if some outcomes are more likely.

False. Regardless of likelihood, the total probability across all outcomes must equal exactly 1.

TRUE FALSE

For mutually exclusive and exhaustive events, the sum of their probabilities equals 1.

For mutually exclusive and exhaustive events, the sum of their probabilities equals 1.

True. Mutually exclusive and exhaustive events partition the sample space, so their probabilities sum to 1.

TRUE FALSE

The probability of an impossible event is 0, so the sum of probabilities of all outcomes can ignore it.

The probability of an impossible event is 0, so the sum of probabilities of all outcomes can ignore it.

False. The sample space only includes possible outcomes, and their probabilities must sum to 1 regardless of impossible events.

TRUE FALSE

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In a fair six-sided die roll, the sum of probabilities for all faces equals 1.

In a fair six-sided die roll, the sum of probabilities for all faces equals 1.

True. Each face has probability 1/6, and $6 \times (1/6) = 1$.

TRUE FALSE

The sum of probabilities of independent events always equals 1.

The sum of probabilities of independent events always equals 1.

False. Independence relates to multiplicative probabilities, not the sum. Independent events don't necessarily sum to 1.

TRUE FALSE

If $P(A) = 0.7$ and $P(B) = 0.5$, then A and B cannot be mutually exclusive events.

If $P(A) = 0.7$ and $P(B) = 0.5$, then A and B cannot be mutually exclusive events.

True. If mutually exclusive, $P(A \text{ or } B) = P(A) + P(B) = 1.2$, which exceeds 1 and violates probability rules.

TRUE FALSE

The sum of probabilities for all outcomes in a finite sample space can be negative.

The sum of probabilities for all outcomes in a finite sample space can be negative.

False. Probabilities must be non-negative ($0 \leq P \leq 1$), and their sum must be exactly 1.

TRUE FALSE

The probability of the entire sample space is 1.

The probability of the entire sample space is 1.

True. By definition, the sample space includes all possible outcomes, so its probability is 1.

TRUE FALSE

In a deck of cards, the sum of probabilities for drawing any suit (hearts, diamonds, clubs, spades) equals 1.

In a deck of cards, the sum of probabilities for drawing any suit (hearts, diamonds, clubs, spades) equals 1.

True. The suits are exhaustive and mutually exclusive, each with P=0.25, summing to 1.

TRUE FALSE

If the sum of probabilities for all outcomes is 0.9, adding a new outcome with P=0.2 makes it valid.

If the sum of probabilities for all outcomes is 0.9, adding a new outcome with P=0.2 makes it valid.

False. The total probability would become 1.1, which exceeds 1. The sum must equal exactly 1.

TRUE FALSE

The sum of probabilities of all elementary events in a sample space is always 1.

The sum of probabilities of all elementary events in a sample space is always 1.

True. Elementary events are distinct and cover the entire sample space, so their probabilities sum to 1.

TRUE FALSE

$P(A) + P(B) = 1$ implies that A and B are complementary events.

$P(A) + P(B) = 1$ implies that A and B are complementary events.

False. A and B must also be mutually exclusive and exhaustive to be complementary. $P(A) + P(B) = 1$ alone doesn't guarantee this.

TRUE FALSE

For any event A, the sum of P(A) and P(A') is 1, where A' is the complement of A.

For any event A, the sum of P(A) and P(A') is 1, where A' is the complement of A.

True. This is the complement rule: $P(A) + P(A') = 1$ by definition.

TRUE FALSE

The sum of probabilities for all outcomes in an infinite sample space must be 1.

The sum of probabilities for all outcomes in an infinite sample space must be 1.

True. This holds for discrete sample spaces (e.g., geometric distribution), though the calculation involves infinite series converging to 1.

TRUE FALSE

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If three events are pairwise mutually exclusive, the sum of their probabilities must be 1.

If three events are pairwise mutually exclusive, the sum of their probabilities must be 1.

False. They must also be exhaustive (cover all outcomes) for their probabilities to sum to 1. Pairwise exclusivity alone is insufficient.

TRUE FALSE

In a valid probability model, the sum of probabilities of all defined outcomes equals 1.

In a valid probability model, the sum of probabilities of all defined outcomes equals 1.

True. This is a necessary condition for any well-defined probability model.