

Probability

SIMPLE PROBABILITY:

Definition - the chance that something (an event) will happen. Probability is always measured as a ratio (fraction) of the number of successful outcomes to the number of possible outcomes and is written as a percentage.

Success - what you WANT to happen (desired outcome)

Possible - what COULD happen (all outcomes)

Failure - what you DON'T want to happen (possible minus success)

Favorable Probability - when probability is above 50% (likely)

Unfavorable Probability - when probability is below 50% (NOT likely)

Neither Favorable Nor Unfavorable - when probability equals 50%

WILL Happen - when probability equals 100%

WON'T Happen - when probability equals 0%

Probability

COUNTING OUTCOMES:

Fundamental (Basic) Counting Principle - multiply the quantities of each choice

Combinations - used when choosing more than one item and order DOESN'T matter

Permutations - used when choosing more than one item and order DOES matter

Sample Space - the set of ALL possible outcomes of an event

THEORETICAL VS. EXPERIMENTAL PROBABILITY:

Theoretical Probability - what SHOULD happen, on average, with many repetitions

Experimental Probability - what actually DOES happen in trials

With increased events, experimental probability approaches (becomes) theoretical probability

Probability

ODDS:

Definition - the ratio of successes to failures. Written as a ratio and reduced to lowest terms.

Favorable Odds - when first number in ratio is LARGER than second number (likely)

Unfavorable Probability - when first number in ratio is SMALLER than second number (NOT likely)

Even Odds - 1:1

Probability

PROBABILITY OF COMPOUND EVENTS:

• **Multiple Events (e.g. pulling TWO cards out of deck)**

Independent Event - an event where the outcome does NOT affect another event's outcome (REPLACING)

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

Dependent Event - an event where the outcome DOES affect another event's outcome (NOT replacing)

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

• **One Event From Multiple Sources (e.g. rolling TWO dice)**

Mutually Exclusive - Events that CANNOT happen at the same time

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

Inclusive - events that may have overlap (CAN happen at same time)

$$\text{Formula: } P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$