Vocabulary: Theoretical and Experimental Probability

Vocabulary

- Experimental probability – probability that is derived from experimental outcomes.
  - If an outcome occurs *x* times in *y* trials, its experimental probability is $\frac{x}{y}$.
    - For example, if a coin is flipped 50 times and lands on heads 23 times, the experimental probability of heads is $\frac{23}{50}$.
- Law of large numbers – a rule that states that, as the number of trials becomes very large, the experimental results will approach the predicted results.
  - For example, if a coin is flipped twice, there is a good chance of getting 100% heads or 100% tails. If a coin is flipped 1,000 times, the percentages of heads and tails will be very close to 50%, which is the theoretical probability.
- Outcome – a single result of an experiment.
- Probability – the likelihood of an event, expressed as a number between 0 and 1.
  - A probability of 0 (or 0%) means that the event is impossible.
  - A probability of 1 (or 100%) means that the event is certain.
  - A probability of $\frac{2}{5}$ (or 0.40, or 40%) means that an event will occur about 2 times out of every 5 trials, or 40% of the time.
- Sample space – the set of all possible outcomes of an experiment.
- Theoretical probability – probability that is derived from logic and calculation.
  - If all outcomes are equally likely, the theoretical probability of an outcome is equal to 1 divided by the number of possible outcomes.
    - For example, the theoretical probability of rolling a "4" on a 6-sided number cube is $\frac{1}{6}$, or about 0.167 (16.7%).
- Trial – a single iteration of an experiment.
  - For example, a single coin flip or a single spin of a spinner might be a trial in an experiment with many flips or many spins.