Probability of Simple Event

Probability: a measure that is associated with how certain we are of outcomes of a particular experiment or activity

Experiment: a planned operation carried out under controlled conditions

Chance Experiment: an experiment whose result is not predetermined

Outcome: a result of an experiment

Sample Space: the list of all the possible outcomes of an experiment

Ways to Represent a Sample Space:

1. List the possible outcomes
2. Create a tree diagram
3. Create a Venn diagram

Event: any combination of outcomes

Equally likely: each outcome of an experiment occurs with equal probability

If an event E has $n(E)$ equally likely outcomes and its sample space S has $n(S)$ likely outcomes, then the *probability* of the event E is:

$$P(E) = \frac{n(E)}{n(S)} = \frac{\text{number of elements in } E}{\text{number of elements in } S}$$

Properties of Probability

1. A probability is a number between 0 and 1, inclusive. The closer the probability of an event to 1, the more likely the event is to happen and the closer the probability of an event to zero, the less likely it is to happen.
2. The probability of an event that cannot happen is 0.
3. The probability of an event that must happen is 1.
4. If the probability of an event E is P, then the probability of the complement of E is $1 - P$.

Practice Exercises

Do as indicated.

1. Three coins are tossed. What is the probability of getting:
   a. three heads
   b. at least two tails
   c. at most two tails
2. A pair of dice is rolled. What is the probability of getting:
   a. sum of seven
   b. sum is odd
   c. sum is less than 4
   d. a double
3. Given a regular deck of cards, a card is drawn at random. What is the probability of getting:
   a. a face card
   b. not a face card
   c. a black Jack
4. A letter is drawn at random from those in MATHEMATICS. Find the probability of each event.
   a. It is a vowel.
   b. It comes from the last 5 letters of the alphabet.
   c. It is a consonant.

Problem Set

Do as indicated.

1. Three coins are tossed. What is the probability of getting:
   a. two heads
   b. at least two heads
   c. no tail
2. A pair of dice is rolled. What is the probability of getting:
   a. sum of five
   b. sum is prime
   c. sum greater than 9
   d. not a double
3. Given a regular deck of cards, a card is drawn at random. What is the probability of getting:
   a. a red number card
   b. not a heart
   c. a black ace
4. A letter is drawn at random from those in MATHEMATICS. Find the probability of each event.
   a. It is the letter M.
   b. It comes from the first half of the alphabet.
   c. It is the letter C.

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