



E.g. Rolling a 6-sided die 5 times =  $6^5$  total possible outcomes

Sample Space: contains all possible permutations of events

If the probability of an event occurring is  $p$ , the probability of it not occurring must be  $1-p$ .

Must always be between 0 and 1

(number of events that have the property of interest) / (number of all possible events)

Binomial Probability

Binomial probability refers to the probability of exactly  $x$  successes on  $n$  repeated trials in an experiment which has two possible outcomes, e.g. coin flip

If the probability of success on an individual trial is  $p$ , then the binomial probability is  $nCx \cdot p^x \cdot (1-p)^{n-x}$

With replacement

Sample space remains the same for successive events

e.g. Drawing an Ace remains  $4 / 52$

Without replacement

Sample space is reduced with successive events

e.g. Drawing an Ace in first event will reduce probability of drawing an Ace in the second event to  $3 / 51$

YouTube playlist

Probabilities

Independent Events

$P(A \text{ and } B) = P(A) * P(B)$

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

Dependent Events

$P(A \text{ and } B) = P(A) * P(B|A)$

$P(B|A) = P(A \text{ and } B) / P(A)$

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