Introduction to Probability

1. what's probability

- Probability is the likelihood of an event occurring.
- This event can be pretty much anything
- probability ranges from 0 to 1 and it's a ratio notice the probability formula

$$p(x) = \frac{\text{wanted outcomes}}{\text{All outcomes}}$$

x is an event
p(x) is the probability of event **x** happening

2. Expected Values

- Expected value is the specific outcome we expect to occur when we run an experiment.
- can also be called an average

categorical

$$E(x) = n*p$$

E(x) is the Expected value
n is the number of experiments
p is the probability

numerical

$$E(x) = \sum_{i=1}^{n} x_i * p_i$$

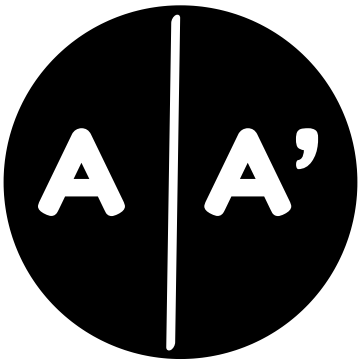
E(x) is the Expected value
x is a random variable
p is the probability
i is the element number
n is the total number of elements
$\sum$ this is called sigma sympol in math it represents the sum

3. probability frequency distrubation

- **probability frequency distribution A collection of the probabilities for each possible outcome of an event.**
- **We need the probability frequency distribution to try and predict future events when the expected value is unattainable.**
- **Frequency is the number of times a given value or outcome appears in the sample space**
- **The frequency distribution table is a table matching each distinct outcome in the sample space to its associated frequency.**

sum	frequency	probability
2	1	1/36
3	2	2/36
4	3	3/36
5	4	4/36
6	5	5/36
7	6	6/36
8	5	5/36
9	4	4/36
10	3	3/36
11	2	2/36
12	1	1/36

4. Complements



Characteristics of complements:

- **Can never occur simultaneously.**
- **Add up to the sample space. (A + A' = Sample space) •**
- **Their probabilities add up to 1. (P(A) + P(A') = 1) •**
- **The complement of a complement is the original event. ((A')' = A)**