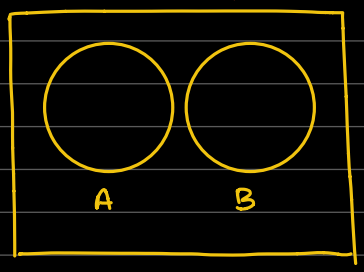
PROBABILITY : PROBABILITY AND STATS

EVENTS

Mutually Exclusive
- Both events cannot happen at the same time

$P(A \cap B) = 0$



NOT Mutually Exclusive

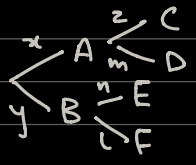
Independent
- The occurrence of A does not affect the occurrence of B

$P(A \cap B) = P(A) \times P(B)$

Non-independent
- The occurrence of A affects the occurrence of B

Tools:

1. Tree diagrams



2. Venn diagram

- $P(A \cup B)$
- $P(A \cap B)$
- $P(A \cap B')$
- $P(A' \cap B')$
- $P(A' \cap B)$

3. PnC

Common formulae

$P(A \cup B) = P(A) + P(B) - P(A \cup B)$

$P(A \cup B) = P(A) + P(B)$ → in case of mutually exclusive events.

$P(A') = 1 - P(A)$

$P(A \cup B) = 1 - P(A' \cap B')$

$P(A \cup B) = P(A \cap B') + P(B)$

Conditional Probability

If A and B are any two events of a sample S and the probability of $B \neq 0$, then the conditional probability of A given that B has occurred is

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

If they are independent events, the conditional probability does not hold.

In that case, $P(A|B) = P(A)$

Attempting probability questions: