# Types Of Probability

- **Joint Probability:** This tells you the likelihood of both events happening together.
- **Marginal Probability:** This focuses on the probability of a single event happening, regardless of the other event.
- **Conditional Probability:** This considers the probability of one event happening given that the other event has already happened.

Here's a breakdown of each concept:

## 1. Joint Probability:

- Think of it as the overlap between two events.
- It represents the probability of both Event A and Event B occurring simultaneously.
- Notation: P(A and B)

### Example:

- Flipping a heads (A) and rolling a 3 (B) on the die.
- P(heads and 3) = The probability of getting both these outcomes together.

## 2. Marginal Probability:

- This looks at each event individually, ignoring the other.
- It's the probability of a single event happening, regardless of the outcome of the other event.
- Notation: P(A) or P(B)

### Example:

- P(heads) = The probability of getting heads, no matter what number you roll on the die.
- P(3) = The probability of rolling a 3, regardless of whether you get heads or tails.

## 3. Conditional Probability:

- This asks, "how likely is Event A to happen, knowing that Event B has already happened?"
- It considers the dependence between events.
- Notation: P(A | B) - probability of A given B

### Example:

- P(heads | 3) = The probability of getting heads after you know you've rolled a 3. (In this case, the outcome of the coin toss doesn't change because the die roll is independent).

## Relationships between these probabilities:

You can calculate these probabilities together. For independent events (like flipping a coin and rolling a die), the joint probability can be obtained by multiplying the marginal probabilities: P(A and B) = P(A) * P(B). However, this doesn't hold true for dependent events.