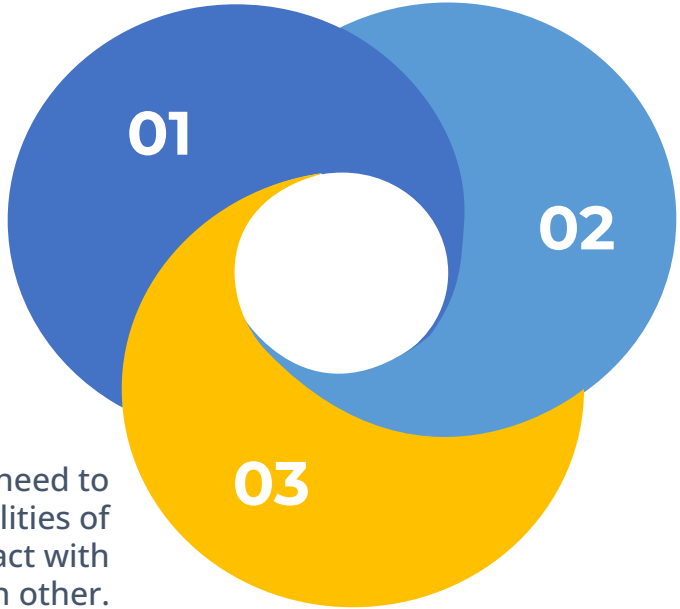
Joint Probability

An overview of joint probability and its application in a real-world example

What is Joint Probability?

Joint probability is the likelihood of two (or more) events happening at the same time.



It calculates how probable it is for both events to occur together.

To find the joint probability, you need to know the individual probabilities of each event and how they interact with each other.

Real-World Example: Beachy Keen

01 Beachy Keen is a company that sells sunscreen and sunglasses during the summer months.

02 She uses joint probability based on last summer's sales data to make an informed decision.

03 Marketing manager, Lisa, wants to bundle products together to increase sales.

Last Summer's Sales Data

01 15% of customers bought both sunscreen and sunglasses.

02 40% of customers bought sunscreen.

03 30% of customers bought sunglasses.

Calculating Joint Probability

01 Lisa calculates the joint probability to understand the likelihood of a customer buying both products.

02 Based on last year's data, the joint probability of a customer buying both sunscreen and sunglasses is 15%.

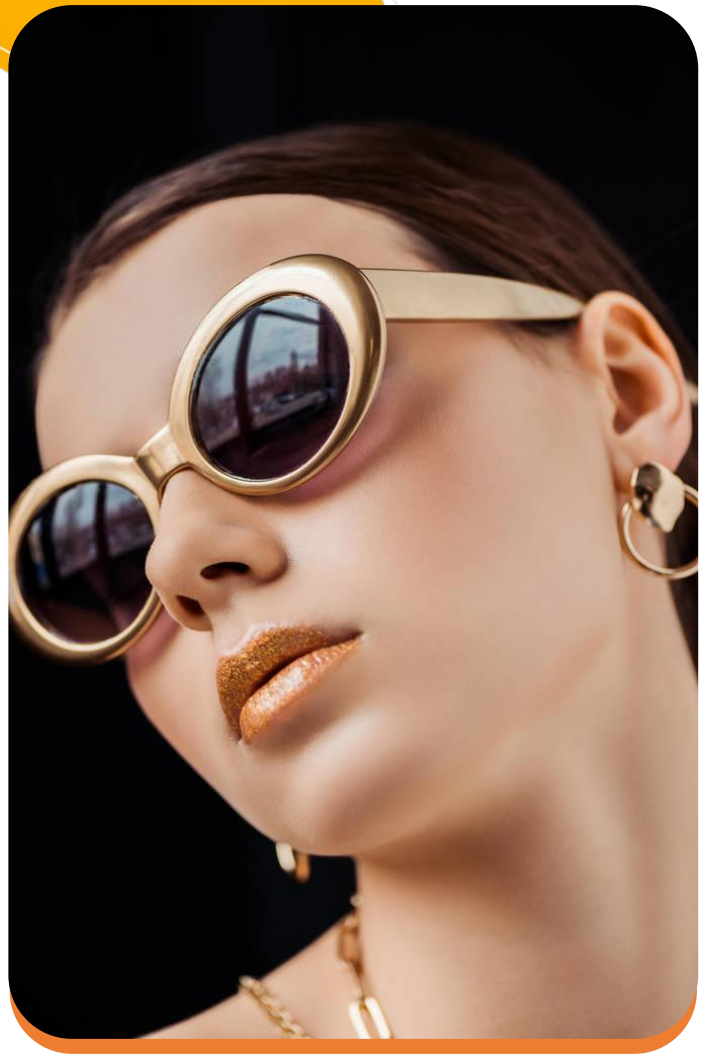
03 This indicates a significant opportunity for product bundling in the summer promotion.

Strategizing the Summer Promotion

01 The promotion can offer both sunscreen and sunglasses together at a discount.

02 By using joint probability, Lisa can target the specific segment of customers likely to purchase both items.

03 She can increase overall sales through effective product bundling.



Let's imagine you have a deck of 52 playing cards. You want to know the probability of drawing a card that is both a red card and a queen. In a deck, there are 2 red queens (the Queen of Hearts and the Queen of Diamonds) out of 52 cards in total.

The joint probability of drawing a card that is both red and a queen is calculated by dividing the number of favorable outcomes (drawing a red queen) by the total number of outcomes (the total number of cards in the deck). So, you have 2 favorable outcomes and 52 possible outcomes.

The joint probability of drawing a red queen is:

$$P(\text{Red and Queen}) = \frac{2}{52}$$

This simplifies to $\frac{1}{26}$, or about 0.0385. This means there's roughly a 3.85% chance that if you draw a card at random from a full deck, it will be both red and a queen. This example shows how joint probability is used to find the likelihood of two specific conditions being met at the same time.

Thanks for watching. 😄