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- Binomial Distribution gives us yes/no or 0/1 outcomes.
- Trial An event with a discrete outcome.
- Success The outcome of interest for a trial.
- Binomial Having two outcomes.
- Binomial distribution Distribution of number of successes in x trials.



VS



Which flavor reigns supreme?

Or are they both equally loved???



Case: 1



Case: 2



VS

vs



Case: 3



To get to the bottom of this mystery, we need to get a sense of what to expect if there is no preference.



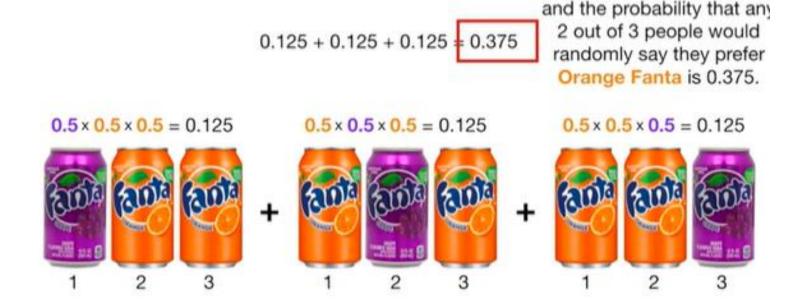
vs



$$pr(x \mid n, p) = \left(\frac{n!}{x!(n-x)!}\right) p^{x}(1-p)^{n-x}$$

Example – Manual Calculation

So let's start with a super simple example and assume that I asked 3 people if they liked Orange Fanta more than Grape Fanta.



Example – Calculate with formula

$$pr(x \mid n, p) = \left(\frac{n!}{x!(n-x)!}\right) p^{x}(1-p)^{n-x}$$



Example – If 4 people say they like orange fanta and 3 people say that they like grape fanta can you conclude that people in general prefer orange fanta?



VS



POISSON DISTRIBUTION

Poisson Distribution

- It is a discrete probability distribution of a discrete random variable X, which has no upper bound.
- It is defined for non-negative values of x.
- It is suitable for rare events for which the probability of occurrence p is very small and the number of trials n is very large.

Example

- Number of printing mistakes per page.
- Number of accidents on a highway.
- Number of defectives in a production center
- Number of telephone calls during a particular loads of times.

Formula

The Poisson probability mass function:

$$P(X = x) = \frac{\lambda^x e^{-\lambda}}{x!}$$

The rpois function in R does this, taking only two arguments — the quantity of random numbers sought, and lambda:

rpois(100, lambda = 2)

This code will generate 100 random numbers from a Poisson distribution with = 2. For example, if incoming customer service calls average 2 per minute, this code will simulate 100 minutes, returning the number of calls in each of those 100 minutes.

Note

- Mean and Variance of Poisson Distribution is the same and is equal to lambda.
- Standard deviation.