4. Plotting and fitting of Geometric distribution and graphical representation of probabilities.

In a Bernoulli trial, the likelihood of the number of successive failures before success is obtained is represented by a geometric distribution, which is a sort of discrete probability distribution. A Bernoulli trial is a test that can only have one of two outcomes: success or failure. In other words, a Bernoulli trial is repeated until success is obtained and then stopped in geometric distribution.

A geometric distribution is a discrete probability distribution that indicates the likelihood of achieving one's first success after a series of failures. The number of attempts in a geometric distribution can go on indefinitely until the first success is achieved. Geometric distributions are probability distributions that are based on three key assumptions.

- *The trials that are being undertaken are self-contained.*
- *Each trial may only have one of two outcomes: success or failure.*
- *For each trial, the success probability, represented by p, is the same*

Geometric Distribution formula

$$P(X=k) = (1-p)^k p$$

Mean:	$\mu = E(X) = \frac{1}{p}$
Variance:	$\sigma^2 = V(X) = \frac{(1-p)}{p^2}$

where:

- **k:** number of failures before first success

- **p:** probability of success on each trial

The chance of a trial's success is denoted by p, whereas the likelihood of failure is denoted by q, q = 1 − p in this case. X ~ G (p) represents a discrete random variable, X, with a geometric probability distribution.

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Probability = (1-p)^k*p

Prob. Of Success on Given trial(p)	0.2
Number of failures before first success	Geometric Distribution
0	0.2
1	0.16
2	0.128
3	0.1024
4	0.08192
5	0.065536
6	0.0524288
7	0.04194304
8	0.033554432
9	0.026843546
10	0.021474836
11	0.017179869