

Stat 215

أمجاد الفيقي _ جويرييه محمد _ الهنوف العتيبي _ نجلاء العبد الوهاب

Geometric Distribution

Geometric Distribution ($X \sim \text{Geom}(p)$). its pmf is given by

$$f(x) = f(x; p) = \begin{cases} pq^{x-1}; & x = 1, 2, \dots \\ 0; & \text{otherwise} \end{cases}$$

Parameter of the Distribution: $0 \leq p \leq 1$ (probability of success).

Mean and Variance: If X is a discrete random variable has geometric distribution with parameter p then, $E(X) = \mu = 1 / p$ and $V(x) = 1-p / p^2 = q / p^2$.

Calculator: TI- 84 plus



1- Press 2nd button



2- Press VARS



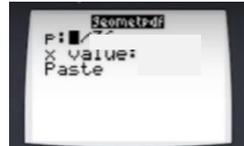
3- Select {D: geometpdf(}



4- Press ENTER



5- Enter the probability value and X value



6- Finally press ENTER



Example:

In a certain manufacturing process it is known that, on the average, 1 in every 100 items is defective. What is the probability that the fifth item inspected is the first defective item found? Find the mean and the variance.

Solution: Let X represents the no. of items until the first defective item is found. The probability of successes (defective item) is $p = 1 \div 100 = 0.01$. Thus, $X \sim \text{Geom}(0.01)$. So, we want to find $P(X = 5) = f(5) = (0.01)(0.99)^4 = 0.0096$.

Using calculator :

- 1- Press 2nd button
- 2- Press VARS
- 3- Select {D: geometpdf(}
- 4- Press ENTER
- 5- Enter the probability value = 0.01 and X value = 5
- 6- Finally press ENTER