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ENACTMENTION OF ICT IN DISCRETE AND CONTINUOUS DISTRIBUTIONS BY THE OPEN SOURCE MATHEMATICS SOFTWARE GEOGEBRA

LATHA. T*
Research Scholar, Department of Mathematics,
SCSVMV University, Enathur, Kanchipuram, Tamil Nadu, India.

SENGAMALASELVI. J
Assistant Professor, Department of Mathematics,
SCSVMV University, Enathur, Kanchipuram, Tamil Nadu, India.

VENUGOPAL. T
Professor of Mathematics, Research and Director of publication,
SCSVMV University, Enathur, Kanchipuram, Tamil Nadu, India.

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ABSTRACT

Many research indicated that ICT has been proven useful as a tool in supporting and transforming teaching and learning. In Mathematics classroom, ICT can help students and teachers to perform calculation, analyses data, explore mathematical concepts thus increasing the understanding in mathematics. This paper explains the Role of open source software Geogebra in the field of discrete distributions and continuous distributions.

Keywords: *Binomial distribution, Exponential distribution, Gamma distribution, Geogebra, Hyper geomentric distribution, ICT, Normal distribution, Poission distribution,Weibull distribution.*

I. INTRODUCTION (HEADING 1)

Teaching Is A Profession Which Lays The Foundation For Preparing The Individuals For All Other Professions. It Is Well Established Dictum That No Nation Can Rise Above The Level Of Teachers. It Is The Teacher Who Plays Pivotal Role In Educational System And Is A Catalytic Agent Of Changes In The Society. Various Factors Influence Teacher's Qualities. Among These Are The Strategies Or The Techniques Which The Teacher Adapts In The Teaching Learning Process.

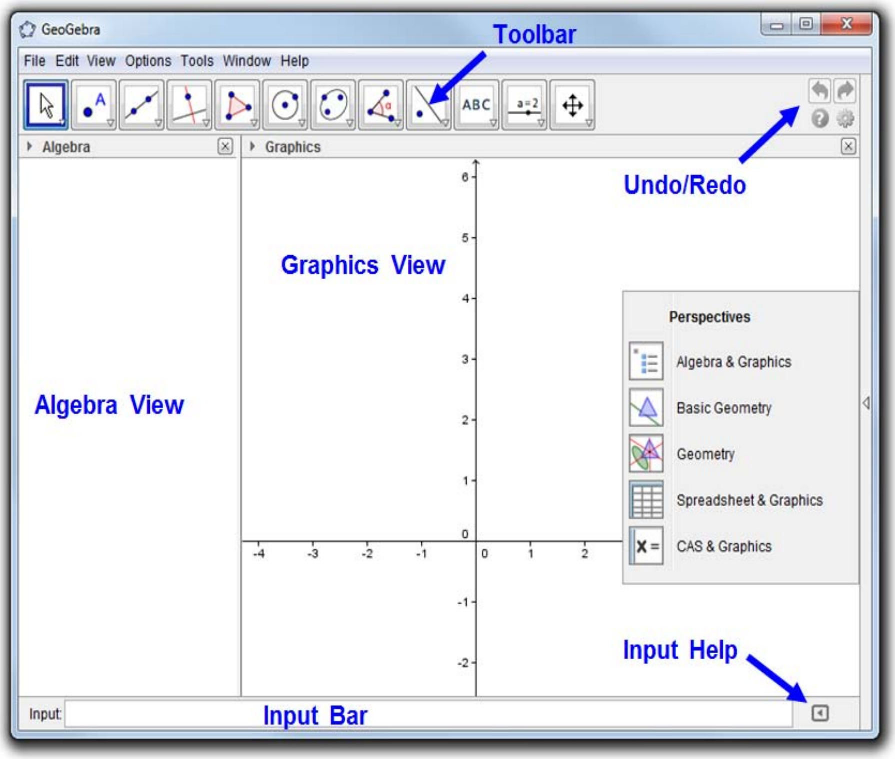
Teachers are considered to be the treasure locks of Knowledge. Their personality should be multifold and multidimensional. They should be well informed. Experience adds on to their efficiency, Experience is said to be great teacher. This experience may be gained by the teacher through the direct or indirect means. The direct access to the source of gaining firsthand experience is neither always possible nor desirable. Consequently most of the learning is based on second hand experiences in the formation received by us about the objects, places, persons, ideas or events. This information received by us about the objects, places, person's ideas events. This information provides a base for our knowledge and understanding about them and the environment surrounding them. For this purpose the teacher must be able to learn the art of getting information, store and make its use as and when directed.

Information and communication technologies (ICT) popularly known, involve in the most general since the use of Technology in managing and processing information. More specifically ICT can be defined as the use of all conceivable digital media in managing and processing information. Information is power. "No more that its origin cannot be traced. With knowledge come learning, skills, adaptability, understanding and activism all factors contribute to the growth of an equitable society. ICT offers the means to acquire the power. Since knowledge is vital, it follows that the acquisition of knowledge must be lifelong. Delores Commission (1996) describes learning throughout life as the "heart beat of society" But how does one keep pace with the rapidly changing world? The answer is obvious-through ICT. ICT provides "anytime, anywhere" access to reliable information It paves the way for construction of knowledge by any individual. In addition ICT universalize education in the truest sense. To quote the National Curriculum Framework (NCF) 2005, "ICT is an important tool for bridging social studies; ICT should be used in such a way that it becomes and opportunity equalizer by providing information communication and computing resources in remake areas".

A belief promoted in research literature (Fasieyitan, Libii and Hirchbuhl 1996) and amongst the administration is that university/college education can make imaginative or innovative use of ICT to enrich the learning environment and support student learning. It can be used to make students facet knowledge public and help them develop met cognitive skills to become more reflective and self-regulated learners. A shift from teacher-centered instruction to learner-centered instruction is needed to enable students to acquire the new millennium knowledge and skills. The shift will take place in changing from a focus on teaching to a focus on learning (sanclholts, Ringstaff and Dwyer 1977). We are entering a new era of digital learning in which are in the process of transitions from broadcast learning to interactive learning to interrelate learning (Topscott 1998). Today students no longer want to be passive recipients in the information transfer model of learning. Rather, they want to be active participants in the learning process. Therefore education systems around the world are under increasing pressure to use ICT to teach students the knowledge skills; they need in the 21^{st} century.

The National Curriculum Framework (2005) appreciated that the psychological impact of ICT's and the potential they offer for global sharing of knowledge cannot be denied. ICT should be used to enhance learning in all parts of the curriculum and Interdisciplinary and cross-disciplinary thinking. Opportunities for professional development in the area be given to teacher so that they can efficiently perform the role of facilitators, thus allowing students to learn independently.

ICT TOOLS WITH GEOGEBRA



BINOMIAL DISTRIBUTION

A. Definition: *A Bernoulli trial can result in a success with probability p And a failure with probability q=1-p. Then the probability distribution of the binomial random variable X, the number of successes in n independent trials is,*

$f = P(X = x) = {}^{n}c_{x}p^{x}q^{n-x}$ x=0, 1, 2, 3… n.

The quantities n and p are called the parameters of binomial distribution. The random variable X is discrete as it Takes only integer values.

Before studying Binomial distribution let us see briefly about Bernoulli distribution.

A Bernoulli distribution is one having the following Properties.

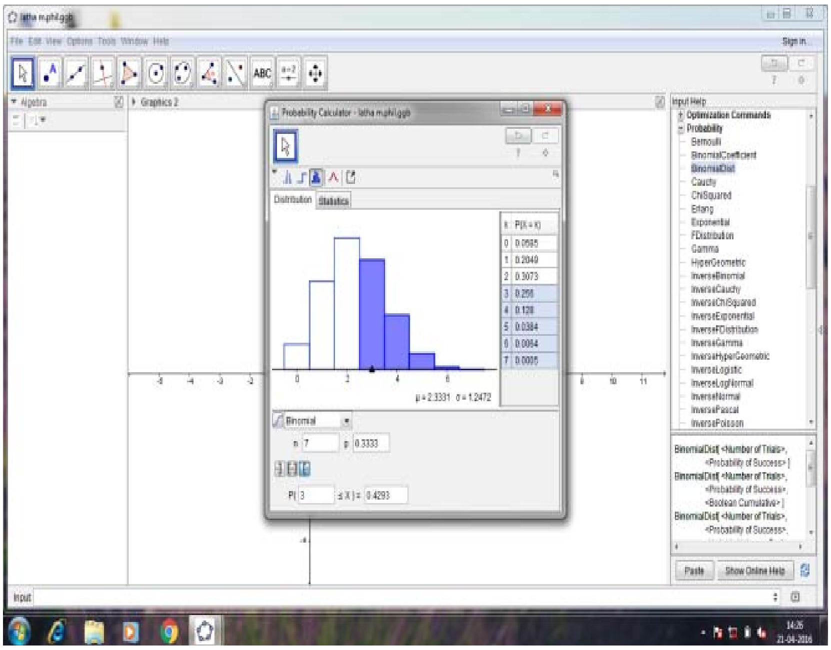
1. The experiment consists of n repeated trials.
2. Each trial results in an outcome that may be classified under two mutually exclusive categories as a success or as a failure.
3. The probability of success denoted by p remains constant from trial to trial.
4. The repeated trials are independent.

B. Example

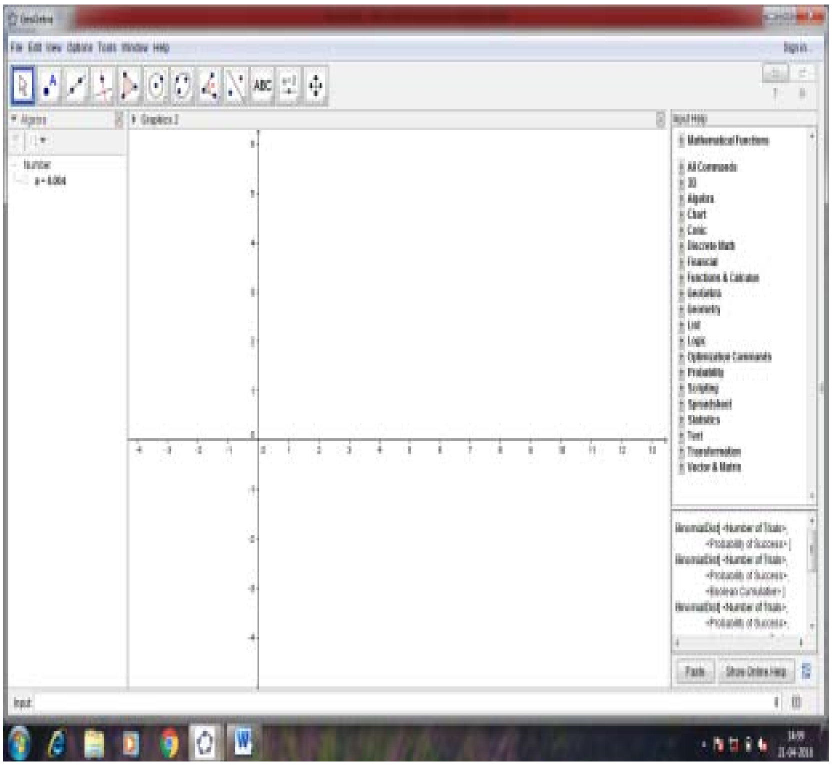
1. If on the average rain falls on days in every 30 days, Obtain the Probability that

(1) Rain will fall on at least 3 days of a given week.

(2) First three days of a given week will be fine and the remaining 4 days wet.

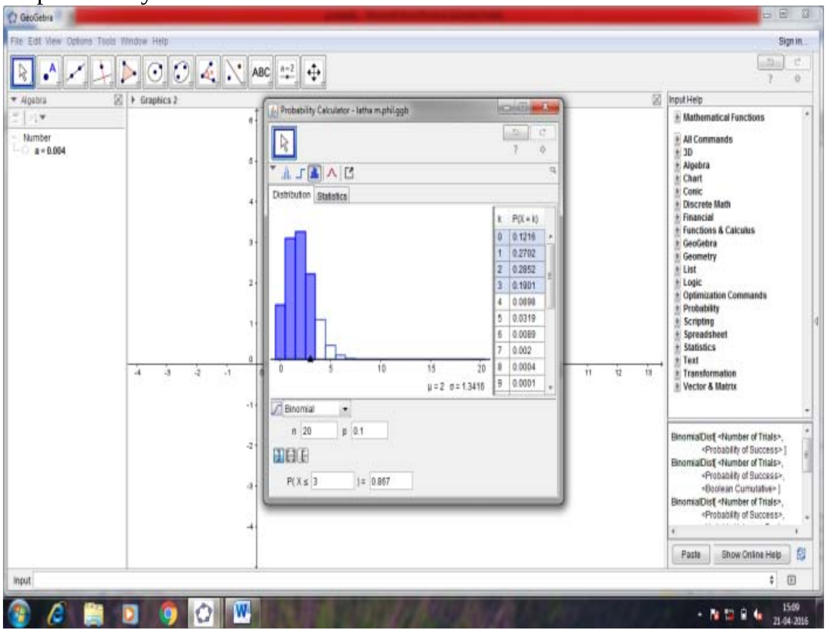


Ans: 0.4293



Ans: 0.004

2. In a large consignment of electric bulbs 10 per cent Are defective. A random sample of 20 is taken for inspection. Find the probability that at most there are 3 defective bulbs.



Ans: 0.867

II. POISSON DISTRIBUTION

C. Definition: *The probability distribution of the Poisson random variable X, representing the number of outcomes occurring in a given time interval or specified region represented as t, is*

$$P\,(X=x)=\frac{e^{-\lambda t}}{x!}(\lambda t)^{x},\quad x=0,\,1,\,2\ldots$$

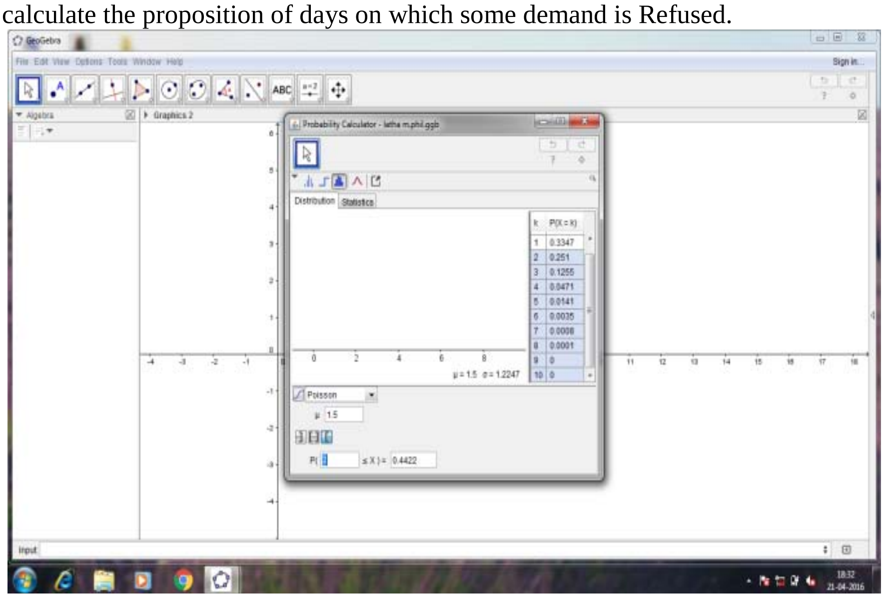
Where λ is the average number of outcomes per unit time or Region.

D. Properties of poisson variable

1. The number of outcomes occurring during a time interval is independent of the number that occurs in any other disjoint time interval. So it is memory less.
2. The probability that a single outcome will occur during a very short time interval is proportional to the length of the time interval. It does not depend on the number of outcomes that occur outside this time interval.
3. The probability that more than one outcome will occur in such a short time interval is negligible.

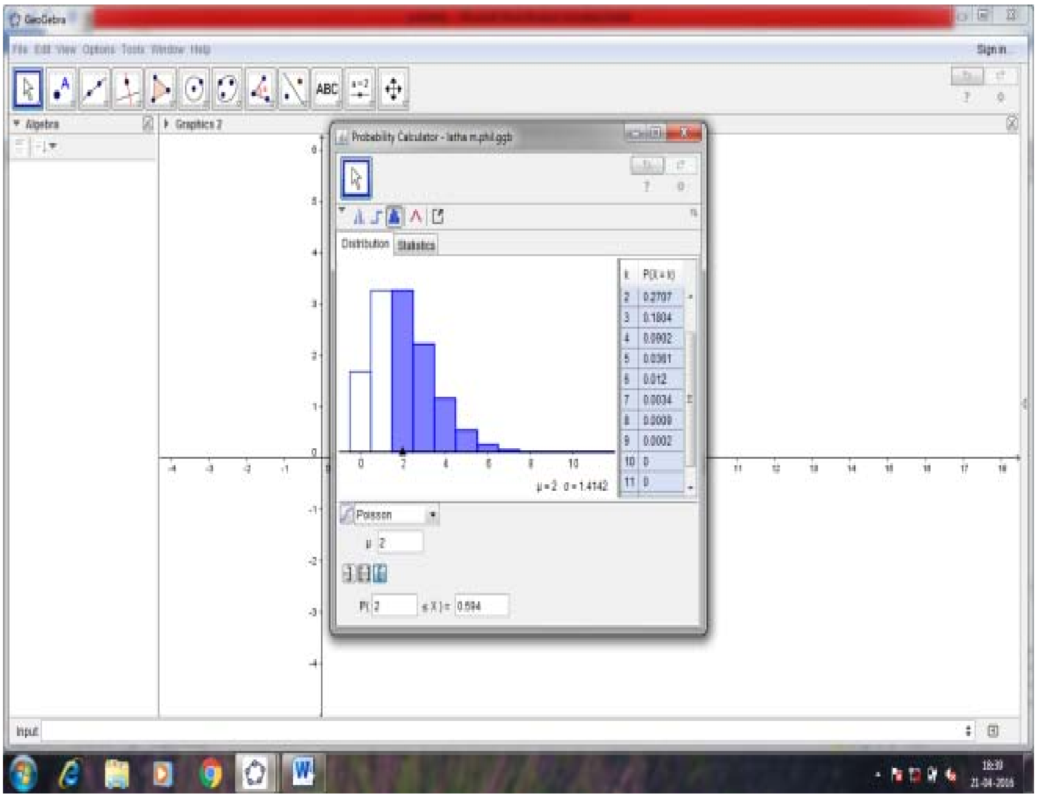
E. Example

1. A travel company has 2 cars for having the demand for a car On each day is distributed as Poisson variate with mean 1.5 calculate the proposition of days on which some demand is Refused.



Ans: 0.4422

2. The probability of indudial suffering the bad reaction from an injection of certain. Antibiotic is 0.001 out of 2000 indusial find the probability that more than 2 Suffer from bad reaction.



Ans: 0.594

III. GAMMA DISTRIBUTION

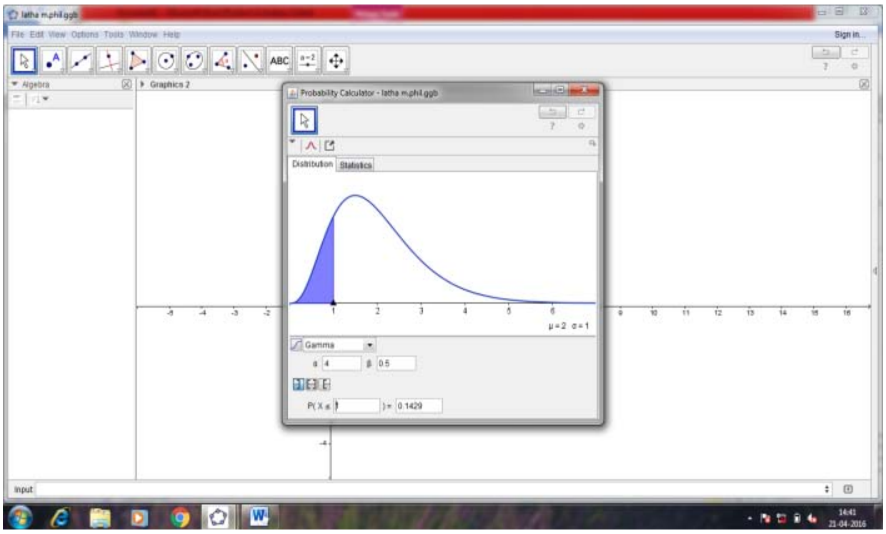
F. ***Definition:*** *The continuous random variable X has a gamma distribution with parameters α and β, if its density function is given byWhere α ≥ 0 and β≥0.*

Γ (α) is the gamma function defined as

Γ (α)=$\int_0^\infty x\^(\alpha-1)e^{-x}dx$ for α≥0

G. Example:

The length of the time to repair an article is gamma distributed With mean and variance as 2 and 1 respectively. Find the probability that the next defective article arriving will be repaired in less than one hour, assuming the random variable.



Ans: 0.1429

IV. NORMAL DISTRIBUTION

H. Definition: *The Binomial distribution and Poisson distribution discussed above are discrete probability distributions. The graph of this distribution is called normal curve, a bell-shaped curve extending in both the directions, arriving nearer and nearer to the horizontal axis but never touches it.*

A continuous random variable x, its probability density function

$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-1/2(x-\mu/\sigma)^2}$, $-\infty<x<\infty$

$-\infty<\mu<\infty$

$\sigma>0$

Is said to follow normal distribution.

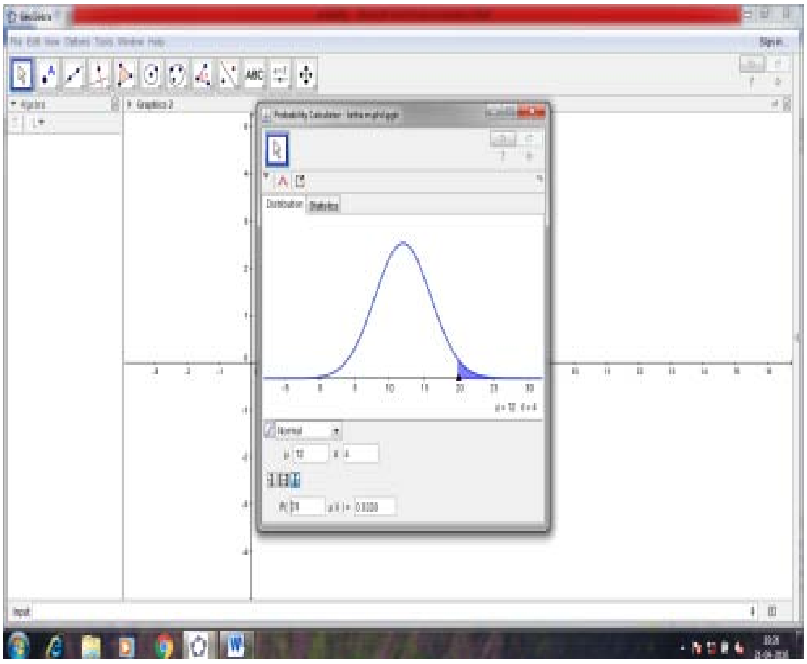
I. Example

1. If x is normally distributes with μ=12 and α=4. Find Out the Probability of

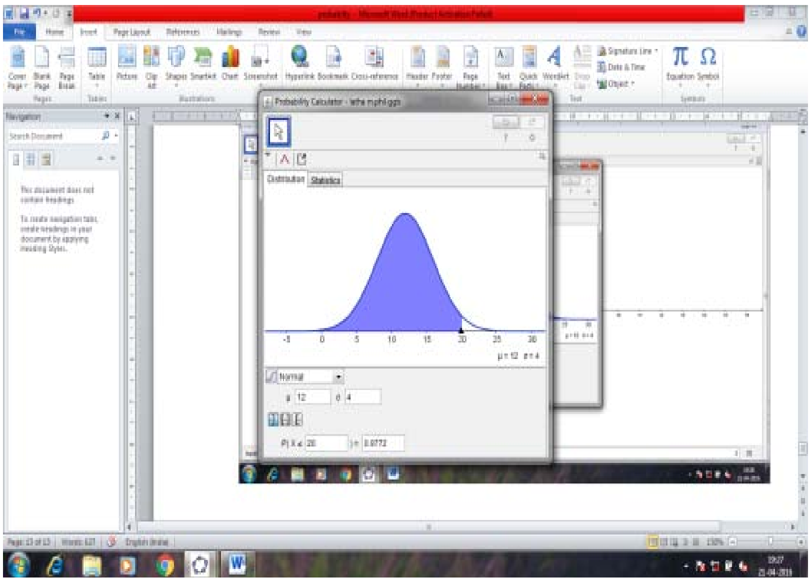
(1) x≥20

(2) x≤20

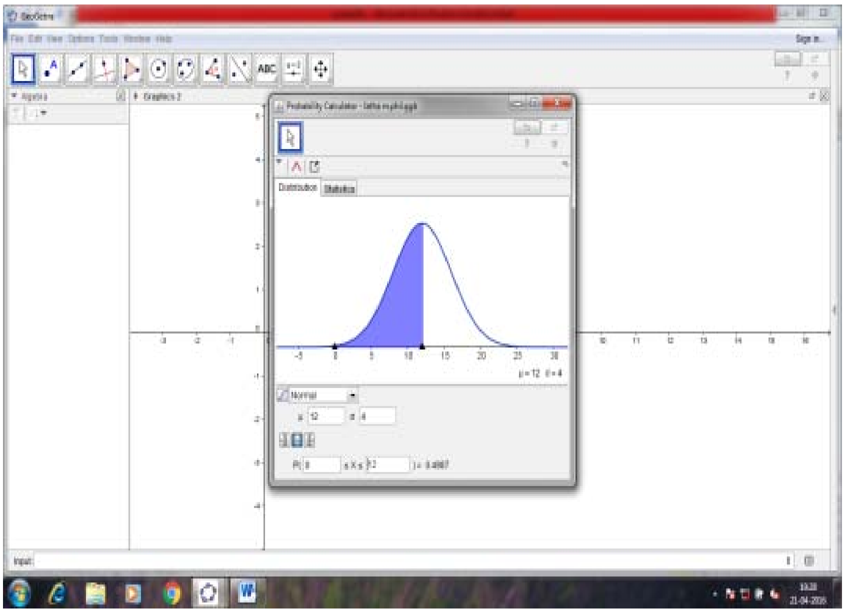
(3) 0≤x≤12



Ans: 0.0228

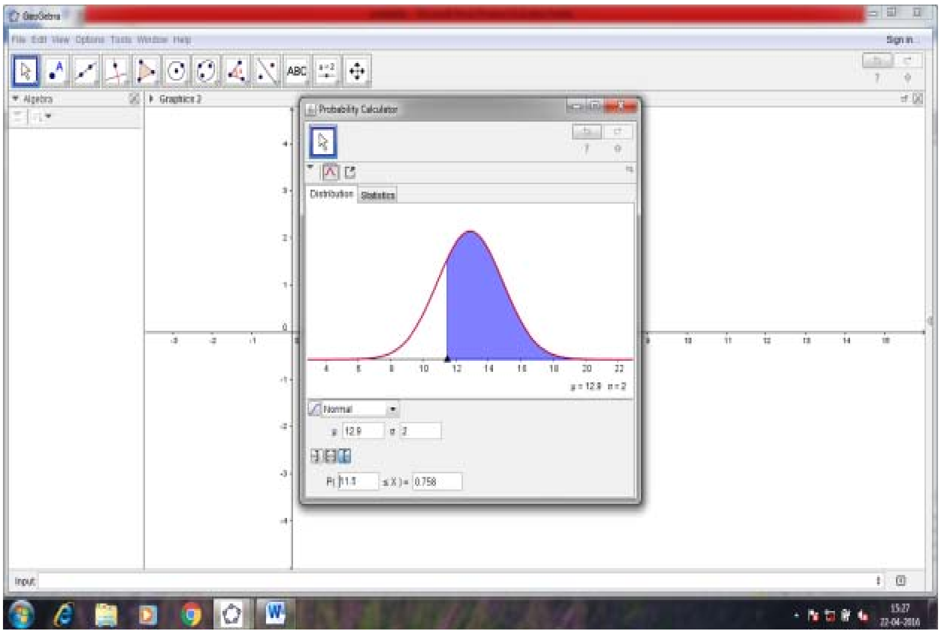


Ans: 0.9772



Ans: 0.4987

2. The time required to assemble a piece of machinery is a random variable having approximately a normal distribution with μ=12.9 minutes and $\sigma = 2.0$ minutes. What are the probabilities that the assembly of a piece of machinery of this kind will take more than 11.5 minutes.



Ans: 0.758

V. HYPER GEOMETRIC DISTRIBUTON

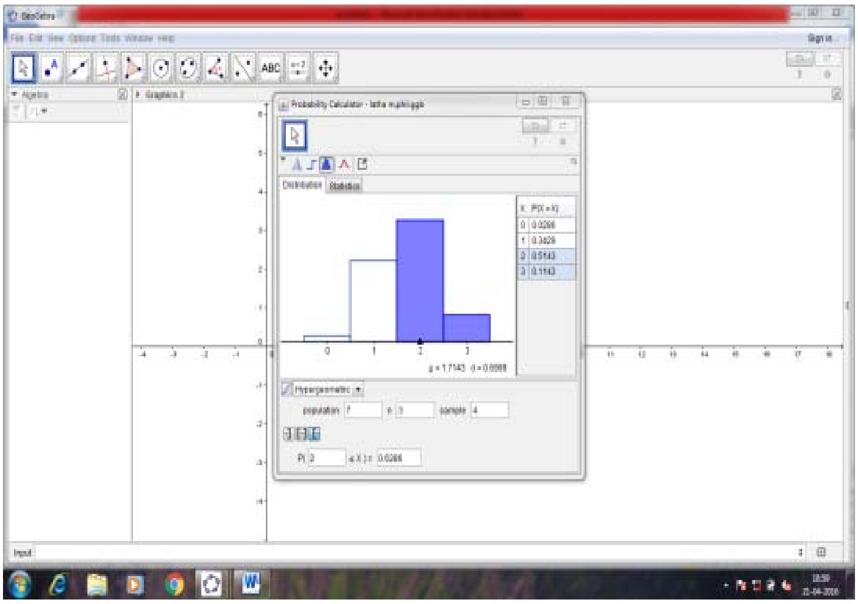
J. Definition: *If x represents the number of found, when n items are drawn without replacement from a lot of N items containing K defectives and N-K non-defectives*, *then*

$P\ (x = r) = {}^{k}c_{r}\,{}^{N-K}c_{n-r}/{}^{n}c_{n}$

r=0, 1, 2 …min (n, k)

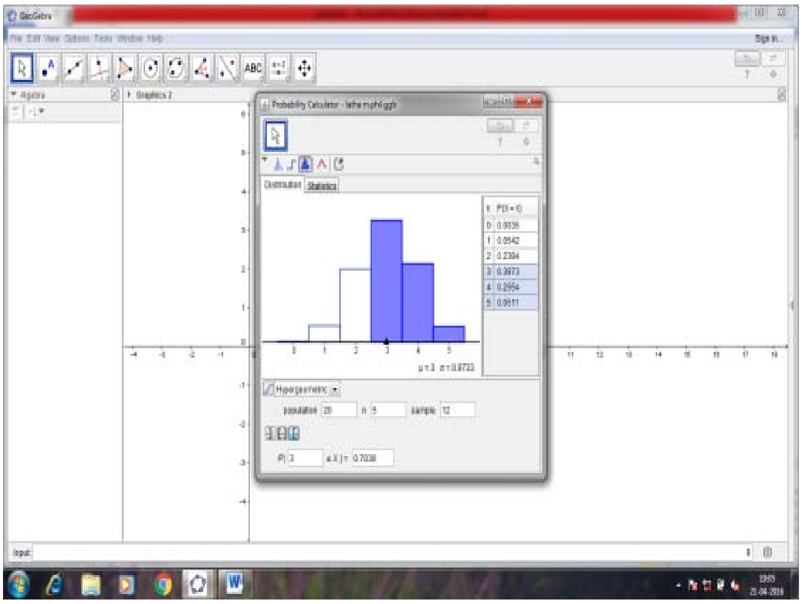
K. Example

1. A panel of 7 judges is to be desired which of the twoFinal Contestants A and B will be declared the winner. A simple majority of the judges will determine the winner. Assume that 4 of the judges will vote for aim and other three votes for B. If we randomly select 3 of the judges and seek they verdict. What is the probability that the majority of will favour A.



Ans: 0.6286

2. A taxi cab company has 12 ambassadors and 8 fiets if 5 of the taxi cabs are in the workshop for replaced and the ambassadors is as likely to be in repairs has a fiets. What is the probability that at least 3 of the ambassadors?



Ans: 0.7038

II. EXPONENTIAL DISTRIBUTION

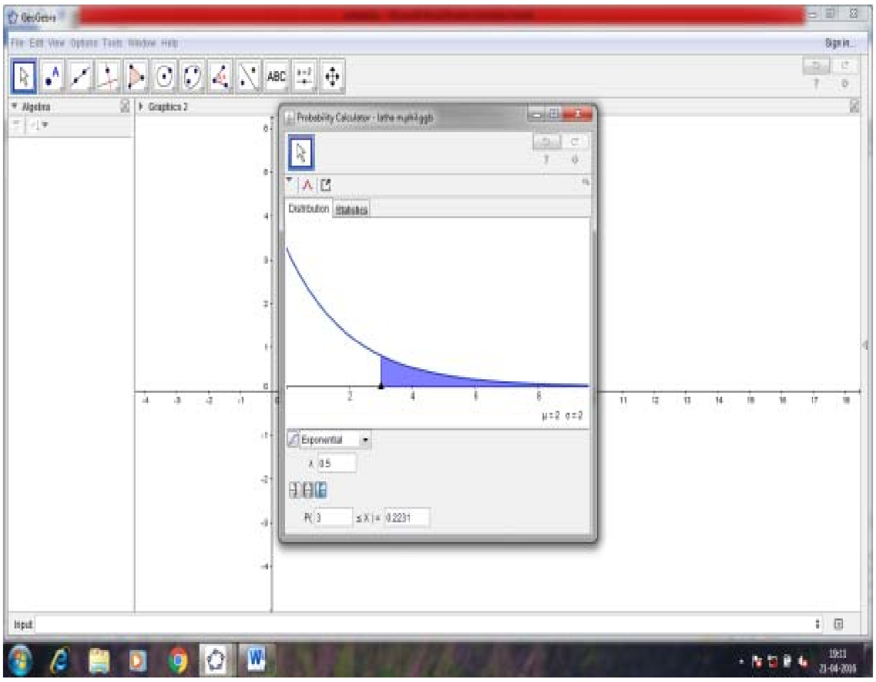
A. Definition: *The continuous random variable X has an exponential distribution if its density function is given by*

$F_x(x) = \frac{1}{\beta} e^{-x/\beta}$ x>0, β>0

0 Elsewhere

B. Example

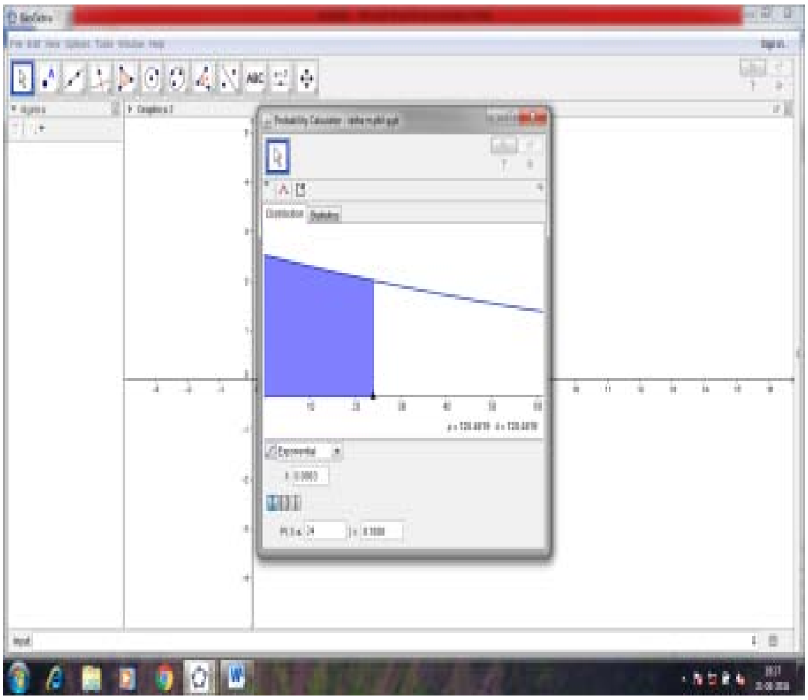
1. Suppose that during a rainy season in a tropical Island. The length of the shower as an exponential distribution with average 2 minutes. Find the probability that the shower will be there for the more than 3 minutes.



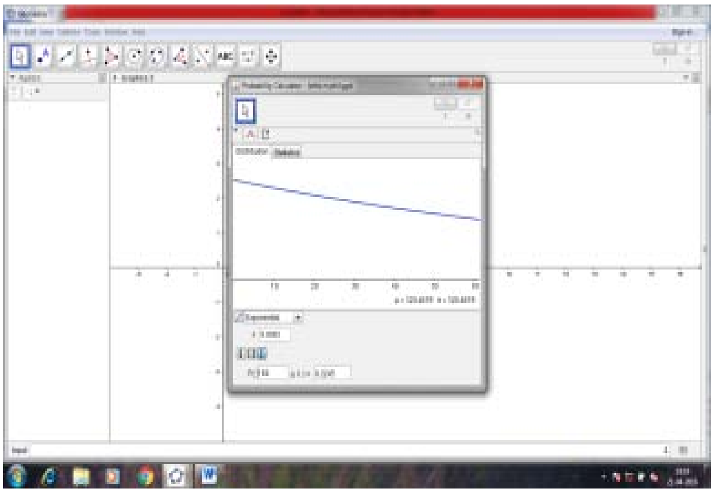
Ans: 0.2231

2. The amount of time that watch can run without having to be resent is a random variable having exponential distribution with mean 120 days. Find the probability that such a watch will

(1) How to be reset in less than 24 days.
(2) Not have to be reset for at least 180 days.



Ans: 0.1806



Ans: 0.2245

VII. WEIBULL DISTRIBUTION

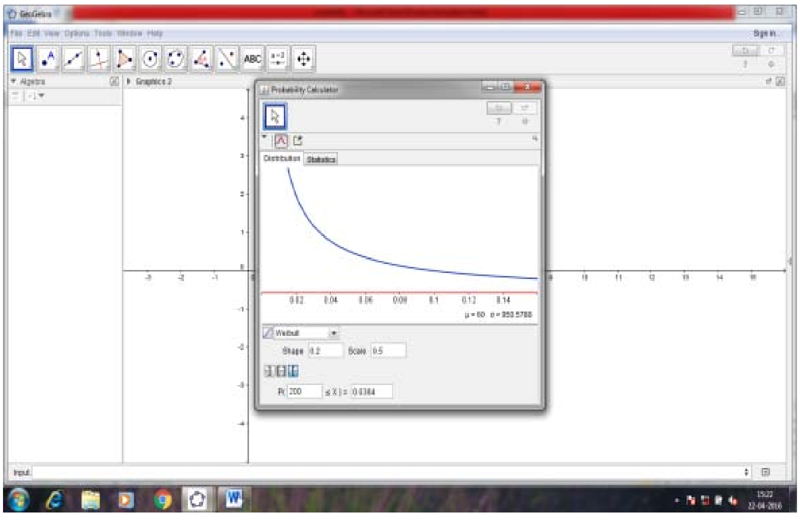
C. Definition: *The continuous random variable X has a Weibull distribution, if its density function is given by*

$$f(x) = \begin{cases} \alpha\beta x^{\beta-1} e^{-\alpha x^{\beta}}, & x>0 \\ 0 & \text{elsewhere} \end{cases}$$

Where $\alpha > 0$ and $\beta > 0$.

D. *Example*

1. The life time in hours of a component is a random variable having weibull distribution with parameters. α =0.2 and β =0.5. Find the probability that such a component will be working for more than 200 hrs.



Ans: 0.0364

CONCLUSION

The result of the study indicated that there was a Significant difference between the means of the student's scores on the probability calculator in favor of the Geogebra group.

This tool can be used as complementary activities to the regular classroom setting, where students can get immediate feedback of their findings, in the classrooms activities as well as in their homework.

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Corresponding Author: Latha. T*
Research Scholar, Department of Mathematics,
SCSVMV University, Enathur, Kanchipuram, Tamil Nadu, India.

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