**Assignment Number 10**

NEGATIVE BINOMIAL, GEOMETRIC and HYPER-GEOMETRIC DISTRIBUTION

Register Number: 1740256

**Date:** 12/2/2018

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**Question 2**

**Aim** – Consumers spend an average of $21 per week in cash without being aware of where it goes. Assume that the amount of cash spent without being aware of where it goes is normally distributed and that the standard deviation is $5. Obtain the probability that a randomly selected person will spend:

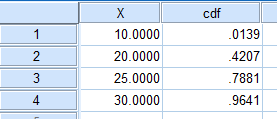
1. more than $25,
2. between $10 and $20,
3. less than $30.

**Procedure-**

1. Open a new SPSS file.
2. In the variable view, define a variable (x) to act as the normal random variable. (It should be a scale variable [measure] and increase the decimal spaces)
3. In order to obtain the required the figures, the cumulative distribution function values when x = 10,20,25 and 30 is required.
4. In the variable view, enter the values of x under the ‘x’ column.
5. Now, in the “Transform” dropdown list, click on the “Compute Variable…”option.
6. In the dropdown box, enter a name for the target variable (CDF).
7. Choose the “CDF & Noncentral CDF” function group and since it a normal random variable, choose the “Cdf.Normal” option in the “Functions and Special Variables list”.
8. Edit the numeric expression (CDF.NORMAL(quant, mean, stddev)) and then finally click on “Ok.”
9. The statistics to obtain the required figures have been obtained.

**Calculations-**

1. more than $25 - **P(X>25) = 1 – P(X<25) = 1 – 0.7881 = 0.2119**
2. between $10 and $20 – **P(10<X<20) = 0.4207 – 0.0139 = 0.4068**
3. less than $30 – **P(X<30) = 0.9641**



**Conclusions-**

With the help of SPSS, the cumulative distribution function for various values of the normal random variable can be calculated at ease. Probability calculations related to a normal distribution can be done using SPSS.

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**Question 3**

**Aim** –A certain kind of equipment requires repairs on the average once in two years. Assuming that the time between repairs are exponentially distributed, what is the probability that such an equipment will work   
(i) at least 3 years without requiring repairs,   
(ii) at most two years without requiring repairs and   
(iii) between 2 to 4 years.

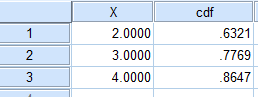
**Procedure** –

1. Open a new SPSS file.
2. In the variable view, define a variable (x) to act as the exponential normal random variable. (It should be a scale variable [measure] and increase the decimal spaces)
3. In order to obtain the required the figures, the cumulative distribution function values when x = 2,3,4 is required.
4. In the variable view, enter the values of x under the ‘x’ column.
5. Now, in the “Transform” dropdown list, click on the “Compute Variable…”option.
6. In the dropdown box, enter a name for the target variable (CDF).
7. Choose the “CDF & Noncentral CDF” function group and since it a normal random variable, choose the “Cdf.Exp” option in the “Functions and Special Variables list”.
8. Edit the numeric expression (CDF.EXP(quant, scale)) and then finally click on “Ok.”
9. The statistics to obtain the required figures have been obtained.

**Calculations** –

(i) at least 3 years without requiring repairs, = **P(X>=3) = 1 – P(X<3) = 1 – 0.7769 = 0.2231**  
(ii) at most two years without requiring repairs and = **P(X<=2) = 0.6321**  
(iii) between 2 to 4 years = **P(2<X<4) = 0.8647 – 0.6321 = 0.2326**

**Conclusions** –



**Conclusions-**

With the help of SPSS, the cumulative distribution function for various values of the normal random variable can be calculated at ease. Probability calculations related to a exponential distribution can be done using SPSS.

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