FITTING OF BINOMIAL DISTRIBUTION USING OFFICE AUTOMATION

Problem (1): Fit a Binomial distribution to the following data using Libre Office Calc.

x :	0	1	2	3	4	5	6	7	8
f:	2	6	30	52	67	56	82	10	1

Aim: To fit a Binomial distribution to the given data using Libre Office Calc.

Procedure:

Step 1: Click on the Libre Office Calc on the Desktop, then a blank sheet appears on the screen with rows and columns.

Step 2: Enter the data into the cells.

Step 3: Calculate f×x values in the separate column next to the data using the formula '= (f*x)'.

Step 4: Calculate the totals of frequencies and f×x values using the function '=sum (select all the f values)' and '= sum (select all f×x values)'.

Step 5: Now enter the 'n' value in a separate cell which represents "number of trials".

Step 6: Calculate the mean value for the given data using the formulae "=(Σ f×x)/(Σ f)" I an empty cell.

Step 7: Next calculate p and q values using the formulae "=mean/n" and "=1-p" respectively in empty cells.

Step 8: Now calculate the probability values in an empty column next to f×x values. For this go to function wizard -> select 'Statistical' under categories -> select Binom.dist and then click on next.

Step 9: Then a dialogue box appears on the screen. Select the first value of x in the tab 'number_s' and then enter the 'n' value in the tab 'trials', enter the 'p' value in the tab 'SP' and enter the value 0 i.e., false in the tab 'cumulative' and then click on OK.

Step 10: The first probability value appears on the screen. Select the cell and then drag to get the remaining probabilities.

Step 11: Now calculate the 'expected frequencies' in the separate column using the formula '=N × select the first probability value' in the first cell. Drag the cells to get the remaining frequencies.

Step 12: Calculate the total of the expected frequencies using the function '= sum (select all the frequency values)'. Next select all the expected frequencies and right click and select 'format cells' option. Then a dialogue box appears on the screen. Select the option 'number' and then select '(-1234)' and click on OK.

Step 13: Save the file in a separate folder.

OUTPUT:

FITTING OF BINOMIAL DISTRIBUTION

No. of heads (x)	f	f*x	Probabilities P(x)	Expected frequencies = N*p(x)
0	2	0	0.001761273	1
1	6	6	0.017040479	5
2	30	60	0.072129826	22
3	52	156	0.174465643	53
4	67	268	0.263745445	81
5	56	280	0.255176098	78
6	82	492	0.154303236	47
7	10	70	0.053317776	16
8	1	8	0.008060223	2
Totals:	**306**	**1340**		**306**

No. of trials (n) :	8
Mean:	4.379084967
Probability of success (p):	0.547385621
Probability of failure (q):	0.452614379

Problem (2): Fit a Binomial distribution to the following data using Libre Office Calc.

x :	0	1	2	3	4	5	6	7	8	9	10
f:	4	22	50	72	6	94	90	80	22	6	2

Aim: To fit a Binomial distribution to the given data using Libre Office Calc.

Procedure:

Step 1: Click on the Libre Office Calc on the Desktop, then a blank sheet appears on the screen with rows and columns.

Step 2: Enter the data into the cells.

Step 3: Calculate f×x values in the separate column next to the data using the formula '= (f*x)'.

Step 4: Calculate the totals of frequencies and f×x values using the function '=sum (select all the f values)' and '= sum (select all f×x values)'.

Step 5: Now enter the 'n' value in a separate cell which represents "number of trials".

Step 6: Calculate the mean value for the given data using the formulae "=(Σ f×x)/(Σ f)" I an empty cell.

Step 7: Next calculate p and q values using the formulae "=mean/n" and "=1-p" respectively in empty cells.

Step 8: Now calculate the probability values in an empty column next to f×x values. For this go to function wizard -> select 'Statistical' under categories -> select Binom.dist and then click on next.

Step 9: Then a dialogue box appears on the screen. Select the first value of x in the tab 'number_s' and then enter the 'n' value in the tab 'trials', enter the 'p' value in the tab 'SP' and enter the value 0 i.e., false in the tab 'cumulative' and then click on OK.

Step 10: The first probability value appears on the screen. Select the cell and then drag to get the remaining probabilities.

Step 11: Now calculate the 'expected frequencies' in the separate column using the formula '=N × select the first probability value' in the first cell. Drag the cells to get the remaining frequencies.

Step 12: Calculate the total of the expected frequencies using the function '= sum (select all the frequency values)'. Next select all the expected frequencies and right click and select 'format cells'

option. Then a dialogue box appears on the screen. Select the option ‘number’ and then select ‘(-1234)’ and click on OK.

Step 13: Save the file in a separate folder.

OUTPUT:

FITTING OF BINOMIAL DISTRIBUTION				
x	**f**	**f*x**	**Probabilities P(x)**	**Expected frequencies = N*p(x)**
0	4	0	0.001261015	1
1	22	22	0.011973602	5
2	50	100	0.051161358	23
3	72	216	0.129543467	58
4	6	24	0.215257497	96
5	94	470	0.2452699	110
6	90	540	0.194074166	87
7	80	560	0.105301462	47
8	22	176	0.037494744	17
9	6	54	0.007911569	4
10	2	20	0.00075122	0
Total:	**448**	**2182**		**448**

No. of trials (n) :	10
Mean:	4.870535714
Probability of success (p):	0.487053571
Probability of failure (q):	0.512946429

FIITING OF POISSON DISTRIBUTION USING OFFICE AUTOMATION

Problem (1): Fit a Poisson distribution to the following data and also calculate the expected frequencies using Office automation.

X	0	1	2	3	4	5
f	142	156	69	27	5	1

AIM: To fit a Poisson distribution to the given data using Office Automation.

PROCEDURE:

Step 1: Click on the Libre Office Calc on the desktop. Then a blank sheet appears on the screen with rows and columns.

Step 2: Enter the data into the cells.

Step 3: Calculate the total frequency by using the formula '= sum (select all the frequency values)' and then click on enter.

Step 4: In the next column enter the heading as 'f*x' and calculate the f*x values by using the formula '=f value * x value' and the click on enter in the first cell. Then the first value appears on the screen, select the cell and then drag to get the remaining values.

Step 5: Calculate the Σf*x value in an empty cell by using the function '= sum(select all the values of f*x)' and then click on enter.

Step 6: Next calculate the mean value in an empty cell using the formula '= Σfx / Σf' and then click on enter.

Step 7: In the next column calculate the probability values. For this go to function wizard -> select 'statistical' under 'categories' -> select Poisson.dist and then click on Next.

Step 8: Then a window appears on the screen. Select the first value of x in the tab 'number', enter the 'mean' value in the tab 'lambda' and enter the value '0' in the tab 'cumulative' and then click on Ok.

Step 9: The first probability value appears on the screen. Select the cell and then drag to get the remaining probabilities.

Step 10: In the next column calculated the ‘expected frequencies’ using the formula ‘=N value * probability value’ and then click on enter.

Step 11: The first frequency value appears on the screen. Select the cell and then drag to get the remaining frequencies.

Step 12: Select all the expected frequency values and then right click on it and then select the option ‘format cells’. Then a window appears on the screen. Select the ‘number’ option in it and then select (-1234) and click on ok.

Step 13: Save the file in a separate folder.

OUTPUT:

Fitting of Poisson distribution				
x	**f**	**f*x**	**Probabilities p(x)**	**expected frequencies = N * p(x)**
0	142	0	0.367879441	147
1	156	156	0.367879441	147
2	69	138	0.183939721	74
3	27	81	0.06131324	25
4	5	20	0.01532831	6
5	1	5	0.003065662	1
Total:	**400**	**400**		**400**

mean :	1

Problem (2): Fit a Poisson distribution to the following data and also calculate the expected frequencies using Office automation.

X	0	1	2	3	4
f	122	60	15	2	1

AIM: To fit a Poisson distribution to the given data using Office Automation.

PROCEDURE:

Step 1: Click on the Libre Office Calc on the desktop. Then a blank sheet appears on the screen with rows and columns.

Step 2: Enter the data into the cells.

Step 3: Calculate the total frequency by using the formula '= sum (select all the frequency values)' and then click on enter.

Step 4: In the next column enter the heading as 'f*x' and calculate the f*x values by using the formula '=f value * x value' and the click on enter in the first cell. Then the first value appears on the screen, select the cell and then drag to get the remaining values.

Step 5: Calculate the Σf*x value in an empty cell by using the function '= sum(select all the values of f*x)' and then click on enter.

Step 6: Next calculate the mean value in an empty cell using the formula '= Σfx / Σf' and then click on enter.

Step 7: In the next column calculate the probability values. For this go to function wizard -> select 'statistical' under 'categories' -> select Poisson.dist and then click on Next.

Step 8: Then a window appears on the screen. Select the first value of x in the tab 'number', enter the 'mean' value in the tab 'lambda' and enter the value '0' in the tab 'cumulative' and then click on Ok.

Step 9: The first probability value appears on the screen. Select the cell and then drag to get the remaining probabilities.

Step 10: In the next column calculated the 'expected frequencies' using the formula '=N value * probability value' and then click on enter.

Step 11: The first frequency value appears on the screen. Select the cell and then drag to get the remaining frequencies.

Step 12: Select all the expected frequency values and then right click on it and then select the option ‘format cells’. Then a window appears on the screen. Select the ‘number’ option in it and then select (-1234) and click on ok.

Step 13: Save the file in a separate folder.

OUTPUT:

Fitting of Poisson distribution				
x	**F**	**f*x**	**Probabilities p(x)**	**expected frequencies = N * p(x)**
0	122	0	0.60653066	121
1	60	60	0.30326533	61
2	15	30	0.075816332	15
3	2	6	0.012636055	3
4	1	4	0.001579507	0
Total:	**200**	**100**		**200**

mean:	0.5

FITTING OF NEGATIVE BINOMIAL DISTRIBUTION USING OFFICE AUTOMATION

Problem (1): Fit a Negative Binomial distribution to the following data and calculate the expected frequencies.

No. of Cells (x)	0	1	2	3	4	5	**Total**
Frequency (f)	213	128	37	18	3	1	**400**

AIM: To fit a Negative Binomial distribution to the given data using Office Automation.

PROCEDURE:

Step 1: Click on the Libre Office Calc on the desktop. Then a blank sheet appears on the screen with rows and columns.

Step 2: Enter the data into the cells.

Step 3: Calculate the total frequency by using the formula '= sum (select all the frequency values)' and then click on enter.

Step 4: In the next column enter the heading as 'f*x' and calculate the f*x values by using the formula '=f value * x value' and the click on enter in the first cell. Then the first value appears on the screen, select the cell and then drag to get the remaining values.

Step 5: Calculate the Σf*x value in an empty cell by using the function '= sum(select all the values of f*x)' and then click on enter.

Step 6: Next calculate the mean value in an empty cell using the formula '= Σfx / Σf' and then click on enter.

Step 7: In the next column calculate '$f*x^2$' values by using the formula '= f value * x value^2' and then click on enter. Then we will get the first value; drag the cells to get the remaining values.

Step 8: In an empty cell calculate the '$\Sigma f*x^2$' value using the function '= sum (select all the $f*x^2$ values)' and then click on enter.

Step 9: Now calculate the variance value using the formula ' = ($\Sigma f*x^2/ \Sigma f$) – (mean value ^2)' and then press enter.

Step 10: In an empty cell calculate the p value using the formula '= mean value / variance value'.

In the next empty cells calculate the q value and r value by using the formulae '= 1- p' and '(= mean*p)/q' values respectively.

Step 11: Now calculate the probabilities in the next empty column by selecting the function 'NegBinom.dist' from the function wizard where the 'category' is selected as 'statistical' and then clicking on next.

Step 12: Then a window appears on the screen. Select the 'x' value in the tab 'number _ f', enter the 'r' value in the tab 'number _ s' and enter the 'p' value in the tab 'probability of success' and then click on ok.

Step 13: Then a first probability value appears on the screen. Select the cell and drag to get the remaining probabilities'.

Step 14: In the next empty column calculate the 'expected frequencies' by using the formula '=N*p(x)' and then press enter. Then the first value appears on the screen. Select the cell and drag to get the remaining frequencies.

Step 15: Calculate the total of the expected frequencies by sing the function '=sum(selected all the expected frequencies'.

Step 16: Select al the expected frequencies and right click on them and then select the option 'format cells'. Then a window appears on the screen. Select the option (-1234) and click on ok.

Step 17: Save the file in a separate folder.

OUTPUT:

Fitting of negative binomial distribution					
x	**f**	**f*x**	**f*x^2**	**probabilities p(x)**	**expected frequencies = N*p(x)**
0	213	0	0	0.499851567	200
1	128	128	128	0.318237498	127
2	37	74	148	0.126631474	51
3	18	54	162	0.04031085	16
4	3	12	48	0.011228204	4
5	1	5	25	0.002859437	1
Totals:	**400**	**273**	**511**		**400**

mean:	0.6825
variance:	0.811694
Probability of success (p) value:	0.840834
Probability of failure (q) value:	0.159166
number of success (r) value:	4

Problem (2): Fit a Negative Binomial distribution to the following data and calculate the expected frequencies.

No. of Cells (x)	0	1	2	3	4	5	6	**Total**
Frequency (f)	350	145	80	7	4	3	1	**590**

AIM: To fit a Negative Binomial distribution to the given data using Office Automation.

PROCEDURE:

Step 1: Click on the Libre Office Calc on the desktop. Then a blank sheet appears on the screen with rows and columns.

Step 2: Enter the data into the cells.

Step 3: Calculate the total frequency by using the formula '= sum (select all the frequency values)' and then click on enter.

Step 4: In the next column enter the heading as 'f*x' and calculate the f*x values by using the formula '=f value * x value' and the click on enter in the first cell. Then the first value appears on the screen, select the cell and then drag to get the remaining values.

Step 5: Calculate the Σf*x value in an empty cell by using the function '= sum(select all the values of f*x)' and then click on enter.

Step 6: Next calculate the mean value in an empty cell using the formula '= Σfx / Σf' and then click on enter.

Step 7: In the next column calculate '$f*x^2$' values by using the formula '= f value * x value^2' and then click on enter. Then we will get the first value; drag the cells to get the remaining values.

Step 8: In an empty cell calculate the '$\Sigma f*x^2$' value using the function '= sum (select all the $f*x^2$ values)' and then click on enter.

Step 9: Now calculate the variance value using the formula ' = ($\Sigma f*x^2/ \Sigma f$) – (mean value ^2)' and then press enter.

Step 10: In an empty cell calculate the p value using the formula '= mean value / variance value'. In the next empty cells calculate the q value and r value by using the formulae '= 1- p' and '(= mean*p)/q' values respectively.

Step 11: Now calculate the probabilities in the next empty column by selecting the function ‘NegBinom.dist’ from the function wizard where the ‘category’ is selected as ‘statistical’ and then clicking on next.

Step 12: Then a window appears on the screen. Select the ‘x’ value in the tab ‘number _ f’, enter the ‘r’ value in the tab ‘number _ s’ and enter the ‘p’ value in the tab ‘probability of success’ and then click on ok.

Step 13: Then a first probability value appears on the screen. Select the cell and drag to get the remaining probabilities’.

Step 14: In the next empty column calculate the ‘expected frequencies’ by using the formula ‘=N*p(x)’ and then press enter. Then the first value appears on the screen. Select the cell and drag to get the remaining frequencies.

Step 15: Calculate the total of the expected frequencies by sing the function ‘=sum(selected all the expected frequencies’.

Step 16: Select al the expected frequencies and right click on them and then select the option ‘format cells’. Then a window appears on the screen. Select the option (-1234) and click on ok.

Step 17: Save the file in a separate folder.

OUTPUT:

Fitting of negative binomial distribution					
x	**f**	**f*x**	**$f*x^2$**	**probabilities p(x)**	**expected frequencies = N*p(x)**
0	350	0	0	0.572718996	338
1	145	145	145	0.278591137	164
2	80	160	320	0.101637569	60
3	7	21	63	0.032960115	19
4	4	16	64	0.010020617	6
5	3	15	75	0.002924633	2
6	1	6	36	0.000829877	0
Total:	**590**	**363**	**703**		**590**

mean:	0.615254
variance:	0.812988
Probability of success (p) value:	0.756782
Probability of failure (q) value:	0.243218
number of success (r) value:	2

FITTING OF EXPONENTIAL DISTRIBUTION USING OFFICE AUTOMATION

PROBLEM: Fit an exponential distribution to the following data and also calculate the expected frequencies.

Class Interval:	0 - 3	3 – 6	6 – 9	9 – 12	12 – 15	15 – 18
Frequency:	190	70	25	10	4	1

AIM: To fit an exponential distribution to the given data using office automation.

PROCEDURE:

Step 1: Click on the Libre Office Calc. Then a blank sheet appears on the screen with rows and columns.

Step 2: Enter the data into the cells.

Step 3: In the next empty column enter the mid values of the class intervals.

Step 4: In the next column calculate the 'f×m' values using the formula '= f *m' and then press enter.

Step 5: Next calculate the Σf and Σf×m values using the function '= sum(select all the frequency values)' and '= sum(select all f×m values)' respectively.

Step 6: In an empty cell calculate the mean value using the formula '=Σf×m / Σf'.

Step 7: In the next empty cell calculate the 'lambda' value by using the formula '=1/mean' and press enter.

Step 8: In an empty column enter the class limits from the lower limit of the first class to the upper limit of the last class.

Step 9: Now calculate the probabilities F(x) by selecting the function 'expon.dist' from the 'function wizard' where the category is selected as 'statistical' and then click on Next.

Step 10: Now a window appears on the screen. Select the 'class limit' value in the tab 'x' values, enter the lambda value in the tab 'lambda' and enter the 'cumulative' as '1' and then press OK.

Step 11: Next calculate the delta values in the next column using the formula '=F(x +1) – F(x)'.

Step 12: In the next column calculate the expected frequencies using the formula '= N * delta'.

Step 13: Select all the expected frequencies and right click on them and then select the option ‘format cells’. Then a window appears on the screen. Select the option (-1234) and then click on Ok.

Step 14: Save the file in a separate folder.

OUTPUT:

Fitting of an exponential distribution							
Class Limits	**frequency**	**Mid Values (m)**	**f* m**	**class limits**	**Probabilities F(x)**	**delta = F(x +1) - F(x)**	**Exepected frequencies = N*delta**
0 – 3	190	1.5	285	0	0	0.607248994	182
3 – 6	70	4.5	315	3	0.607248994	0.238497653	72
6 – 9	25	7.5	187.5	6	0.845746647	0.093670193	28
9 – 12	10	10.5	105	9	0.939416844	0.036789063	11
12 – 15	4	13.5	54	12	0.976205903	0.014448941	4
15 – 18	1	16.5	16.5	15	0.990654845	0.005674836	2
				18	0.996329681		
Totals:	**300**		**963**				**299**

Mean:	3.21
Lambda:	0.31152648

FITTING OF CAUCHY DISTRIBUTION USING OFFICE AUTOMATION

PROBLEM: Fit an Cauchy distribution to the following data and also calculate the expected frequencies using Office Automation.

Class Interval	-∞ to -25	-25 to -19	-19 to -13	-13 to -7	-7 to -1
Frequency	2	1	2	4	41

Class Interval	-1 to 5	5 to 11	11 to 17	17 to 23	23 to ∞
Frequency	137	7	2	1	3

AIM: To fit an exponential distribution and also calculate the expected frequencies using Office Automation.

PROCEDURE:

Step 1: Click on Libre Office Calc. Then a blank sheet appears on the screen with rows and columns.

Step 2: Enter the data into the cells.

Step 3: In the next column enter the class limits (x) from -∞ to ∞.

Step 4: In the next empty column Calculate the Probabilities F(x) by using the formula '= (0.5) + ((1/180)*degrees(atan(select the class limit value))) to all the cells except for the first row and the last row. For -∞ consider the probability value as 0 and for +∞ consider the probability value as 1.

Step 5: In the next column calculate the delta values using the formula '=F(x+1) – F(x)' and then press enter.

Step 6: Now in an empty column next to delta values calculate the expected frequencies using the formula '= N * delta'.

Step 7: Select all the expected frequencies and right click on them and select the option (-1234) from 'format cells' option and then click on Ok.

Step 8: Calculate the total frequencies by using the formula '=sum(select all the expected frequencies)' and then press enter.

Step 9: Save the file in a separate folder.

OUTPUT:

Fitting of Cauchy distribution					
class intervals	**Frequencies**	**class limits**	**Probabilities F(x)**	**Delta = F(x+1) - F(x)**	**Expected frequencies = N * delta**
- ∞ to - 25	2	-∞	0	0.012725611	3
- 25 to - 19	1	-25	0.012725611	0.004012097	1
-19 to - 13	2	-19	0.016737708	0.007699544	2
- 13 to -7	4	-13	0.024437252	0.020729983	4
-7 to -1	41	-7	0.045167235	0.204832765	41
-1 to 5	137	-1	0.25	0.687167042	137
5 to 11	7	5	0.937167042	0.03397502	7
11 to 17	2	11	0.971142062	0.010155379	2
17 to 23	1	17	0.981297441	0.00487171	1
23 to ∞	3	23	0.98616915	0.01383085	3
		∞	1		
Total:	**200**				**200**