Kantipur City College

Department of Computer Engineering

Semester IV/ Probability and Statistics

Lab Sheet No.2

Title: Computing Measures of Dispersion using EXCEL.

Objectives: To find absolute and relative measures of dispersion for

i) Individual series

ii) Discrete series

iii) Continuous series

Theory:

Name	Absolute Measures		
	Formula		
	Individual series	Discrete series	Continuous series
Range	$Range = L - S$	$Range = L - S$	$range = upper$limit of highest class interval-lower limit of lowest class interval
Quartile Deviation	Q.D=$\frac{1}{2}$ ($Q_3 - Q_1$)		
Quartiles	Q_i =Value of $\frac{i(n+1)^{th}}{4}$ item i=1,2,3	Q_i =Value of $\frac{i(N+1)^{th}}{4}$ item	Q_i =l+$\frac{h}{f}(\frac{iN}{4} - cf)$
Standard deviation	σ =$\sqrt{\frac{1}{n}\sum X^2 - \bar{X}^2}$	σ =$\sqrt{(\frac{1}{N}\sum fX^2 - \bar{X}^2)}$	σ =$\sqrt{\frac{1}{N}}(\sum fX^2 - \bar{X}^2)$ where X= mid value of class interval
	Relative Measure		
Coefficient of Range	Coeff. of range=$\frac{L-S}{L+S}$		
Coefficient of Q.D	Coeff. of Q.D=$\frac{Q3 - Q1}{Q3 + Q1}$		
Coefficient of variation(C.V)	C.V = $\frac{\sigma}{\bar{X}}$ × 100%		

Lab Work:

1. Calculate mean, median, range, quartile deviation, and standard deviation, coefficient of range, coefficient of quartile deviation, and coefficient of variation.

Marks	24	27	36	48	52	52	54	55	59	60	85	90	95

Excel Formula:

	A	B	C	D
1	Marks	Measures	Value	Formula
2	24	AM	56.69231	=AVERAGE(A2:A14)
3	27	S	24	=MIN(A2:A14)
4	36	L	95	=MAX(A2:A14)
5	48	R	71	=C4-C3
6	52	Coeff of R	0.596639	=(C4-C3)/(C4+C3)
7	52	Q1	48	=QUARTILE(A14,1)
8	54	Q3	60	=QUARTILE(A2:A14,3)
9	55	QD	6	=(C8-C7)/2
10	59	Coeff of QD	0.1	=(C8-C7)/(C8+C7)
11	60	σ	21.31	=STDEV.P(A2:A14)
12	85	CV	37.58652	=(C11/C2)*100
13	90	Variance	454.06	=VAR.P(A2:A14)
14	95			

2. Calculate mean, median, range, quartile deviation, and standard deviation, coefficient of range, coefficient of quartile deviation, and coefficient of variation.

X	500	700	900	1200	1500	1800	2000
f	40	90	111	125	75	60	20

	A	B	C	D	E
1	x	f	cf		
2	500	40	40		
3	700	90	130		
4	900	111	241		
5	1200	125	366		
6	1500	75	441		
7	1800	60	501		
8	2000	20	521		
9					
10					
11	Measures	position	Formula	Value	Formula
12	AM			1138.96	
13	S			500	
14	L			2000	
15	R			1500	
16	Coeff of R			0.6	
17	Q1	130.5	=0.25*(C8+1)	900	=A4
18	Q3	391.5	=0.75*(C8+1)	1500	=A6
19	QD			300	=(G8-G7)/2
20	Coeff of QD			0.25	=(G8-G7)/(G8+G7)
21	σ			418.6145	=SQRT(SUMPRODUCT(B2:B8,A2:A8^2)/C8-G2^2)
22	CV			36.75398	=(G11/G2)*100

3. Calculate mean, median, range, quartile deviation, and standard deviation, coefficient of range, coefficient of quartile deviation, and coefficient of variation.

Vehicles	0-10	10-20	20-30	30-40	40-50
No. of days	3	14	53	20	10

Excel formula:

	A	B	C	D	E	F	G	H	I	J	K
1	Class	f	LCB	UCB	mid value(x)	h	cf	cell	formula		
2	0-10	3	0	10	5	10	3	E2	=(D2+C2)/2		
3	10 - 20	14	10	20	15	10	17	F3	=D2-C2		
4	20-30	53	20	30	25	10	70	G3	=G2+B3		
5	30-40	20	30	40	35	10	90				
6	40-50	10	40	50	45	10	100				
7											
8											
9	Measures	Position	Formula	Class	Value	Formula					
10	AM				27	=SUMPRODUCT(B2:B6,E2:E6)/G6					
11	Q2	45	=0.5*G6	10 - 20	40.00	=C4+F4*(B14-G3)/B4					
12	S				0	=MIN(C2:D6)					
13	L				50	=MAX(C2:D6)					
14	R				50	=E14-E13					
15	Coeff of R				1	=(E13-E12)/(E13+E12)					
16	Q1	22.5	=0.25*G6	10 - 20	23.9	=C4+F4*(B13-G3)/B4					
17	Q3	75	=0.75*(G6)	30-40	32.5	=C5+F5*(B17-G4)/B5					
18	QD				4.3	=0.5*(E17-E16)					
19	Coeff of QD				0.2	=(E17-E16)/(E17+E16)					
20	σ				9.1	=SQRT(SUMPRODUCT(B2:B6,E2:E6^2)/G6-E10^2)					
21	CV				33.54	33.53846347					
22											

Assignments:

Calculate mean, median, range, quartile deviation, and standard deviation, coefficient of range, coefficient of quartile deviation, and coefficient of variation for the following.

1.

Marks X	24	30	28	23	25	22	26	27	28	25

2.

Variable(X)	5	7	9	11	13	15	17	19
Frequency	5	44	60	75	95	82	24	4

3.

Wages	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800
Number of Workers	20	45	85	160	70	55	35	30