Measure of Centeral Tendency

Central Tendenchy: A single vlaue that represents whole data.

TYPES: 1. Arithematic Mean 2. Geomatric Mean 3. Harmonic Mean 4. Mode 5. Median

Un-Grouped Data

X	$D = X - A$	logX	$1/X$
15	5	1.1761	0.0667
28	18	1.4472	0.0357
23	13	1.3617	0.0435
54	44	1.7324	0.0185
15	5	1.1761	0.0667
48	38	1.6812	0.0208
10	0	1.0000	0.1000
59	49	1.7709	0.0169
Sum	252	172	11.34556	0.368827

A 10

26.1935537

31.5 21.5

1. Arithematic Mean

$\bar{X} = \frac{\sum X}{n} = \frac{252}{8} =$ 31.50

$\bar{X} = A + \frac{\sum D}{n} = \frac{172}{8} =$ 31.50

2. Geomatric Mean

$GM = Antilog \frac{\sum \log X}{n} =$ 26.19

3. Harmonic Mean

$HM = \frac{n}{\sum(1/X)} = \frac{8}{0.368827} =$ 21.69

4. Mode No fourmula, just maximum time repeated value

$\bar{X} =$ 15.00

5. Median

$\bar{X} =$ 25.50

Intervals (Marks)		f	X	fX	logX	f logX	f/X
1	9	6	5	30	0.69897	4.19382	1.2
10	18	12	14	168	1.146128	13.75354	0.85714286
19	27	8	23	184	1.361728	10.89382	0.34782609
28	36	13	32	416	1.50515	19.56695	0.40625
37	45	8	41	328	1.612784	12.90227	0.19512195
46	54	3	50	150	1.69897	5.09691	0.06
		50		1276		66.40731	3.0663409

Mean	25.52
GM	21.28
HM	16.30608

Dr. Shabbir Ahmad

Assistant Professor
Department of Mathematics
COMSATS University Islamabad, Wah Campus

Properties of Mean and Variance

Change of Orig and Change of Scale for Mean, Var and St Dev

	X	X	Y=X+5	Y=X-5	Z=3X	Z=X/3	T=3X+5	
	15	15	20	10	45	5	50	
	15	8	13	3	24	2.666667	29	
	15	23	28	18	69	7.666667	74	
	15	54	59	49	162	18	167	
	15	23	28	18	69	7.666667	74	
	15	48	53	43	144	16	149	
	15	10	15	5	30	3.333333	35	
	15	59	64	54	177	19.66667	182	
MEANS	15	30	35	25	90	10	95	Mean
SD	0.00	20.52	20.52	20.52	61.57	6.84	61.57	Sd
Variance	0.00	421.14	421.14	421.14	3790.29	46.79	3790.29	Var

61.5653

X	Y	X+Y	X-Y	X-Xbar	$(X\text{-}Xbar)_2$
15	16	31	-1	15	225
18	42	60	-24	18	324
23	51	74	-28	23	529
54	89	143	-35	54	2916
23	53	76	-30	23	529
48	64	112	-16	48	2304
10	21	31	-11	10	100
59	75	134	-16	59	3481
31.25	51.375	82.625	-20.125	250	10408
19.26	25.07	43.27	11.21		
370.79	628.27	1872.55	125.55		Xbar

Mean

1. The mean of constant is constant
2. Mean is Dependent on change of origion or scale or both
3. Cobined Mean

$$\bar{\bar{X}} = \frac{n_1\bar{X}_1 + n_2\bar{X}_2 + \cdots n_k\bar{X}_k}{n_1 + n_2 + \cdots n_k}$$

4. Sum or deviation from mean is 0 and sum of squared deviation from is minimum.

$\sum(X - \bar{X}) = 0$

$\sum(X - \bar{X})^2$ is minimum

Variance

1. The variance of constant is Zero
2. Variance is independent on change of origion but dependent on change of scale.
3. Cobined Variance

$$S_c^2 = \frac{n_1\left\{S_1^2 + (\bar{X}_1 - \bar{\bar{X}})^2\right\} + n_2\left\{S_2^2 + (\bar{X}_2 - \bar{\bar{X}})^2\right\} + \cdots n_k\left\{S_k^2 + (\bar{X}_k - \bar{\bar{X}})^2\right\}}{n_1 + n_2 + \cdots n_k}$$