Lab no : 1 ***Date : 2080/ /***

Title: Sampling Distribution and Estimation

PROJECT 1.1 (For Ungrouped Data):

Enter the following values in SPSS and calculate mean, standard deviation, range, mode and median:

Weights: 25, 35, 45, 55, 65, 75

WORKING EXPRESSION:

Mean ($\bar{X}$)= $\frac{\Sigma x}{n}$

Standard Deviation (σ) = $\frac{\Sigma(x-\overline{X})}{n}$

Range = Maximum- Minimum

Mode = Data with the highest frequency

Median = $\left(\frac{n+1}{2}\right)^{th\ term}$

PROCEDURE:

1. Select Analyze => Descriptive Statistics => Frequencies.
2. Click Frequencies => Move Weights into Variable(s).
3. Click Statistics. Select Mean, Median, Mode, Range and standard deviation.
4. Click Continue => OK.

Calculation (From SPSS):

Weights		
N	***Valid***	6
	Missing	0
Mean		50.0000
Median		50.0000
Mode		25.00[a]
Std. Deviation		18.70829
Range		50.00

CONCLUSION:

The average weight is found to be 50 units and the median is also same as that of the average weight.

Since multiple mode exist, the smallest weight is taken i.e., 25 units.

The provided weights were deviated by 18.70829.

The difference between maximum and minimum is 50 units.

PROJECT 1.2 (For Ungrouped Data):

Enter the following values in SPSS and calculate mean, standard deviation, range, mode and median:

Weight (x)	*Mid-value (m)*	*Frequency (f)*
20-30	*25*	*4*
30-40	*35*	*6*
40-50	*45*	*7*
50-60	*55*	*21*
60-70	*65*	*23*
70-80	*75*	*2*

WORKING EXPRESSION:

Mean ($\bar{X}$)= $\frac{\Sigma fm}{n}$

Standard Deviation (σ) = $\sqrt{\frac{\Sigma fm^2}{N} - (\bar{X})^2}$

Range = Mid-Value of the Highest-Class Interval – Mid-Value of the Lowest Class Interval

Mode = L + $\frac{f1-f0}{2f1-f0-f2} * i$

Median = $\left(\frac{N}{2}\right)^{th\ term}$

PROCEDURE:

1. Enter the Data Editor Window.
2. Select Data => Weight Cases.
3. Move Frequency into Frequency Variable.
4. Click Ok. Select Analyze => Descriptive Statistics => Frequencies
5. Click the frequencies => Move MidValue into Variable(s)
6. Click the Statistics. Select Mean, Standard Deviation, Range, Mode and Median.
7. Click Continue. Click Ok.

Calculation (From SPSS):

Mid Value					
		Frequency	***Percent***	***Valid Percent***	***Cumulative Percent***
Valid	25.00	4	6.3	6.3	6.3
	35.00	6	9.5	9.5	15.9
	45.00	7	11.1	11.1	27.0
	55.00	21	33.3	33.3	60.3
	65.00	23	36.5	36.5	96.8
	75.00	2	3.2	3.2	100.0
	Total	63	100.0	100.0	

Statistics			
N	***Valid***	63	63
	Missing	0	0
Mean			54.3651
Median			55.0000
Mode			65.00
Std. Deviation			12.55607
Range			50.00

CONCLUSION:

The average weight is found to be 54.3651 units and the median is 55 units.

The weight with highest frequency is 65 units.

The provided weights were deviated by 12.55607.

The difference between maximum and minimum is 50 units.

PROJECT 1.3 (Confidence Interval for Population Mean (μ)):

Enter the following values in SPSS and create a confidence interval assuming normal distribution:

***Length*:** 125, 120, 121, 123, 122, 130, 124, 122, 120, 122, 118, 119, 123, 124, 122, 124, 121, 122, 138, 149, 123, 128, 122, 130, 120, 122, 124, 134, 137, 128, 122, 121, 125, 120, 13 2, 130, 122, 124

WORKING EXPRESSION:

Confidence interval for population mean μ is given by,

$$\bar{X} \pm Z_{\alpha} \text{ . S.E. } (\bar{X})$$

where,

$\bar{X}$: Sample Mean

Z_{α}: Z- value for α level of significance

S.E. $(\bar{X})$: Standard error for mean

PROCEDURE:

1. Enter the data
2. Select Analyze => Compare Means => One sample T Test
3. Click Options => Type 95% Confidence Interval
4. Click Continue => OK.

Calculation (From SPSS):

One-Sample Statistics				
	N	***Mean***	***Std. Deviation***	***Std. Error Mean***
Length	40	125.2750	6.14770	.97204

One-Sample Test						
Test Value = 0						
	t	***df***	***Sig. (2-tailed)***	***Mean Difference***	***95% Confidence Interval of the difference***	
					Lower	***Upper***
Length	128.879	39	.000	125.27500	123.3089	127.2411

CONCLUSION:

Hence, using SPSS it was found that the confidence interval of mean of the population is 123.3089 to 127.2411.