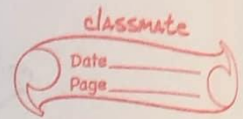


Instructor: Yang Liu

STT 3700/5700 Introduction to Statistical Inference

Utsav Acharya

Q.no. 33

Ans a/w

Data:-

590, 825, 575, 608, 350, 1285, 408, 540, 555, 679

Sample Mean:-

$$\frac{\text{Sum of all values}}{\text{Number of values}}$$

$$= \frac{6405}{10} = 640.5$$

Sample Median:

Ascending order:-

350, 408, 540, 555, 575, 590, 608, 679, 825, 1285

$$\text{Median} = \frac{575 + 590}{2} = 582.5$$

b/w

Modified Data:-

590, 825, 575, 608, 350, 985, 408, 540, 555, 679

$$\text{Mean} = \frac{\text{Sum of all values}}{\text{No. of values}} = \frac{6105}{10} = 610.5$$

Ascending order:-

350, 408, 540, 555, 575, 590, 608, 679, 825, 985

$$\text{Median} = \frac{575 + 590}{2} = 582.5$$

Q. no. 38

Data:-

118.6, 127.4, 138.4, 130.0, 113.7, 122.0, 108.3, 131.5, 133.2

Ans

1. 118.6  $\rightarrow$  120
2. 127.4  $\rightarrow$  125
3. 138.4  $\rightarrow$  140
4. 130.0  $\rightarrow$  130
5. 113.7  $\rightarrow$  115
6. 122.0  $\rightarrow$  120
7. 108.3  $\rightarrow$  110
8. 131.5  $\rightarrow$  130
9. 133.2  $\rightarrow$  135

120, 125, 140, 130, 115, 120, 110, 130, 135

Ascending order:-

110, 115, 120, 120, 125, 130, 130, 135, 140

Median = 125 (5<sup>th</sup> value) Original

b) Ans

Step 1: Round the new value to the nearest 5 mmHg.

127.6  $\rightarrow$  130

update:-

120, 130, 140, 130, 115, 120, 110, 130, 135

Ascending order:-

110, 115, 120, 120, 130, 130, 130, 135, 140

Median = 130 (5<sup>th</sup> value) New





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Data:- 116.4, 115.9, 114.6, 115.2, 115.8

a. Ans

$$\bar{x} = \frac{\text{Sum of all observations}}{\text{Number of observation}}$$

$$= \frac{116.4 + 115.9 + 114.6 + 115.2 + 115.8}{5}$$

$$= \frac{578.5}{5} = 115.78$$

Deviation from mean:

$$x_i - \bar{x}$$

$$= 116.4 - 115.78$$

$$= 0.62$$

$$115.9 - \bar{x} = 0.12$$

$$114.6 - 115.78 = -1.18$$

$$115.2 - \bar{x} = -0.58$$

$$115.8 - \bar{x} = 0.02$$

b. Ans

Sample variance

$$s^2 = \frac{\sum (x_i - \bar{x})^2}{n-1}$$

$$= \frac{2.1279}{5-1}$$

$$= 0.532$$

$$\therefore s = 0.729$$

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Subtract 100 from each observation:-

16.4, 15.9, 14.6, 15.2, 15.8

Mean

$$\bar{y} = \frac{\sum y_i}{n}$$

$$= \frac{77.9}{5} = 15.58$$

The squared deviation:-

0.3844, 0.0144, 1.3924, 0.3364, 0.0004

Sum of squared deviation

$$\sum (y_i - \bar{y})^2 = 2.1279$$

Sample variance

$$s^2 = \frac{2.1279}{4} = 0.532$$

Comparison:-

The sample variance of the transformed values is the same as the variance of the original data.

$$(s^2 = 0.532)$$

Subtracting a constant from each observation does not affect the variance or standard deviation.



Q. no. 47. b Am

Data:-

14.8, 14.5, 16.3, 14.2, 15.9, 13.7, 16.2, 14.6, 13.8, 15.0

Sample mean

$$\begin{aligned} \bar{x} &= \frac{\sum x_i}{n} \\ &= \frac{143.8}{10} \\ &= 14.38 \end{aligned}$$

Deviations from the mean

 $(x_i - \bar{x})$ :-

0.42, 0.12, 1.92, -0.18, 1.52, -0.68, 1.82, 0.22, -0.58, 0.62

Square the deviations

 $(x_i - \bar{x})^2$ 

0.1764, 0.0144, 3.6864, 0.0324, 2.3104, 0.4624, 3.3124, 0.0484, 0.3364, 0.3844

Sum of squared deviation

 $\sum (x_i - \bar{x})^2$ 

= 10.0356

Sample variance

$$s^2 = \frac{\sum (x_i - \bar{x})^2}{n-1}$$

$$= \frac{10.0356}{10-1}$$

$$= 1.115$$

# Thank YOU