PRACTICAL NO 4

**Computations of measures of central tendency (Arithmetic Mean, Median, Mode, Harmonic Mean and Geometric Mean).**

**FORMULA:**

1. **ARITHMETIC MEAN:**
   * 1. Ungrouped data

**AM=**

* + 1. Step deviation method for continuously grouped data only.

**AM =**

1. **GEOMETRIC MEAN:**

**GM=**

1. **HARMONIC MEAN:**

**H.M. =**

1. **MEDIAN:**
2. Ungrouped data:

Find the (n+1)/2 position of data (for odd n) or find the mean of n/2 position and n/2+1 position.

1. Discreet grouped data

Find the x for which the cumulative frequency is just bigger than n/2.

3. Continuously grouped data

**Median=l+**

**5. MODE:**

1. By method of inspection.

2. By using modal class.

**Mode=**

**Question 1:** Compute Mean, Median, Mode for the following data:

|  |  |
| --- | --- |
| x | f |
| 115 | 5 |
| 125 | 25 |
| 135 | 48 |
| 145 | 72 |
| 155 | 116 |
| 165 | 60 |
| 175 | 38 |
| 185 | 22 |
| 195 | 3 |

***Mean computation:***

|  |  |  |
| --- | --- | --- |
| X | F | FX |
| 115 | 5 | 575 |
| 125 | 25 | 3125 |
| 135 | 48 | 6480 |
| 145 | 72 | 10440 |
| 155 | 116 | 17980 |
| 165 | 60 | 9900 |
| 175 | 38 | 6650 |
| 185 | 22 | 4070 |
| 195 | 3 | 585 |
|  | 389 | 59805 |

**MEAN= 153.74036**

***Median Computation:***

|  |  |  |
| --- | --- | --- |
| X | F | CF |
| 115 | 5 | 5 |
| 125 | 25 | 30 |
| 135 | 48 | 78 |
| 145 | 72 | 150 |
| 155 | 116 | 266 |
| 165 | 60 | 326 |
| 175 | 38 | 364 |
| 185 | 22 | 386 |
| 195 | 3 | 389 |

Number of frequency=389

N/2=194.5

**MEDIAN=155**

***Mode Computation:***

By the method of inspection, **155** is the mode of the given data.

**Question 2**: Compute Harmonic mean, Geometric Mean, Arithmetic Mean, Median, for the following data:

**8, 11, 15, 19, 24, 29, 34, 40**

***Harmonic Mean:***

|  |  |
| --- | --- |
| X | 1/X |
| 8 | 0.125 |
| 11 | 0.090909 |
| 15 | 0.066667 |
| 19 | 0.052632 |
| 24 | 0.041667 |
| 29 | 0.034483 |
| 34 | 0.029412 |
| 40 | 0.025 |
| 180 | **0.465769** |

MEAN OF RECIPROCALS= 0.058221066

**HARMONIC MEAN=17.17591367**

***Geometric Mean:***

PRODUCT OF ALL X=23739724800

**GEOMETRIC MEAN=19.81228013**

***Arithmetic Mean:***

**ARITHMETIC MEAN: 22.5**

**MEDIAN: 21.5**

**Question 3:** Compute the mean, median, mode of the following continuous distribution:

|  |  |
| --- | --- |
| X | F |
| 1-5 | 7 |
| 6-10 | 10 |
| 11-15 | 16 |
| 16-20 | 30 |
| 21-25 | 24 |
| 26-30 | 17 |
| 31-35 | 10 |
| 36-40 | 5 |
| 41-45 | 1 |

***The exclusive continuous grouped data will look like:***

|  |  |
| --- | --- |
| X | F |
| 1-6 | 7 |
| 6-11 | 10 |
| 11-16 | 16 |
| 16-21 | 30 |
| 21-26 | 24 |
| 26-31 | 17 |
| 31-36 | 10 |
| 36-41 | 5 |
| 41-46 | 1 |

***Mean computation:***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| X | F | Xi | Di | Ui=Di/H | Fi Ui |
| 1-6 | 7 | 3.5 | -20 | -4 | -28 |
| 6-11 | 10 | 8.5 | -15 | -3 | -30 |
| 11-16 | 16 | 13.5 | -10 | -2 | -32 |
| 16-21 | 30 | 18.5 | -5 | -1 | -30 |
| 21-26 | 24 | **23.5** | 0 | 0 | 0 |
| 26-31 | 17 | 28.5 | 5 | 1 | 17 |
| 31-36 | 10 | 33.5 | 10 | 2 | 20 |
| 36-41 | 5 | 38.5 | 15 | 3 | 15 |
| 41-46 | 1 | 43.5 | 20 | 4 | 4 |
|  | 120 |  |  |  | -64 |

**MEAN=20.833**

***Median Computation:***

|  |  |  |  |
| --- | --- | --- | --- |
| X | F | Xi | CF |
| 1-6 | 7 | 3.5 | 7 |
| 6-11 | 10 | 8.5 | 17 |
| 11-16 | 16 | 13.5 | 33 |
| 16-21 | **30** | **18.5** | **63** |
| 21-26 | 24 | 23.5 | 87 |
| 26-31 | 17 | 28.5 | 104 |
| 31-36 | 10 | 33.5 | 114 |
| 36-41 | 5 | 38.5 | 119 |
| 41-46 | 1 | 43.5 | 120 |

N/2=60

MEDIAN CLASS=16-21

**MEDIAN=20.5**

***Mode:***

MODAL CLASS=16-21

**MODE=19.5**