**Measures of dispersion**

1. 67, 67, 67, 67, 67, 67, 67, 67 $\overbar{X}=67$
2. 66, 66, 66, 67, 67, 68, 68, 68 $\overbar{X}=67$
3. 52, 53, 61, 67, 71, 72, 78, 82 $\overbar{X}=67$
4. 43, 44, 50, 55, 66, 90, 91, 97 $\overbar{X}=67$

Types

1. Range
2. Quartile deviation/ Semi-interquartile range
3. Mean Deviation
4. Variance
5. Standard deviation

Quartile deviation: $Q.D=\frac{Q\_{3}-Q\_{1}}{2}$

Mean Deviation $M.D from mean=\frac{\sum\_{}^{}\left|X-\overbar{X}\right|}{n}$

$$M.D from median=\frac{\sum\_{}^{}\left|X-median\right|}{n}$$

For Grouped Data

$$M.D from mean=\frac{\sum\_{}^{}f.\left|X-\overbar{X}\right|}{\sum\_{}^{}f}$$

$$M.D from median=\frac{\sum\_{}^{}f.\left|X-median\right|}{\sum\_{}^{}f}$$

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Class limits** | **Mid Points (X)** | **Frequency (f)** | $$\left|X-\overbar{X}\right|=\left|X-67.83\right|$$ | $$f.\left|X-\overbar{X}\right|$$ |
| 45-49 | 47 | 1 | 20.83 | 20.83 |
| 50-54 | 52 | 4 | 15.83 | 63.32 |
| 55-59 | 57 | 17 | 10.83 | 184.11 |
| 60-64 | 62 | 28 | 5.83 | 163.24 |
| 65-69 | 67 | 25 | 0.83 | 20.75 |
| 70-74 | 72 | 18 | 4.17 | 75.06 |
| 75-79 | 77 | 13 | 9.17 | 119.21 |
| 80-84 | 82 | 6 | 14.17 | 85.02 |
| 85-89 | 87 | 5 | 19.17 | 95.85 |
| 90-94 | 92 | 2 | 24.17 | 48.34 |
| 95-99 | 97 | 1 | 29.17 | 29.17 |
| **Sum** |  | $n=\sum\_{}^{}f=$**120** |  | $$\sum\_{}^{}f.\left|X-\overbar{X}\right|=904.9$$ |

$$M.D from mean=\frac{\sum\_{}^{}f.\left|X-\overbar{X}\right|}{\sum\_{}^{}f}$$

$$M.D from mean=\frac{904.9}{120}=7.54$$