Lab. Meteorological Statistics ........ Fourth stage

(First Semester)

Department of Atmospheric Sciences

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***C- The standard deviation***

The standard deviation of a set of N values ,, is denoted ( S )

**1- Calculation the Standard deviation for unclassified data:**

 **SD =** $\sqrt{\frac{\sum\_{}^{}(x\_{i}-\overbar{x})^{2}}{N}}$

***For example***\\ calculate the standard deviation of the following data?

 **( 2,3.5,4,4.5,5)**

|  |  |  |
| --- | --- | --- |
|  |  |  |
| 3  | 3-4=-1  | 1  |
| 3.5  | 3.5-4= -0.5  | 0.25  |
| 4  | (4-4) = 0  | 0  |
| 4.5  | (4.5-4 )= 0.5  | 0.25  |
| 5  | (5-4)= 1  | 1  |
|   |   |   |

SD = $\sqrt{\frac{\sum\_{}^{}(x\_{i}-\overbar{x})^{2}}{N}}$ $\sqrt{\frac{2.5}{5}}$=$\sqrt{0.5}$

**H.W \\ find the standard deviation from the following data :**

**( 2,8,3,7,6,4)**

**2-Calculation the standard deviation of the classified data:**

The standard deviation some times called root mean square deviation ( Rms ) if ,, is mid point of classes and ,, is frequency the standard deviation can be by :

**SD =** $\sqrt{\frac{\sum\_{}^{}f\_{i}(x-\overbar{x})^{2}}{\sum\_{}^{}f\_{i}}}$

***For example***\\ calculate The Standerd deviation of the following data?

|  |  |  |  |
| --- | --- | --- | --- |
| **Class**  |   |   |  |
| 15-19  | 3  | 17  |   |
| 20-24  | 5  | 22  |
| 25-29  | 7  | 27  |
| 30-34  | 15  | 32  |
| 35-39  | 10  | 37  |
| 40-44  | 6  | 42  |
| 45-49  | 4  | 47  |
|   |   =50  |   |

**SD =** $\sqrt{\frac{\sum\_{}^{}f\_{i}(x-\overbar{x})^{2}}{\sum\_{}^{}f\_{i}}}$

#  = 32.8

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Class**  |   |   |  |   |  |   |
| 15-19  | 3  | 17  | 51  | -15.8  | 249.64  | 748. 92 |
| 20-24  | 5  | 22  | 110  | -10.8 | 116.64 | 583.2 |
| 25-29  | 7  | 27  | 189  | -5.8  | 33.64 | 235.48 |
| 30-34  | 15  | 32  | 480  | -0.8 | 0.64 | 9.6 |
| 35-39  | 10  | 37  | 370  | 4.2 | 17.64 | 176.4 |
| 40-44  | 6  | 42  | 252  | 9.2 | 84.64 | 507.8 |
| 45-49  | 4  | 47  | 188  | 14.2 | 201.64 | 806.56 |
|   | =50  |   | =1640   |    |    |   =3068  |

SD =  