도수분포에서의 평균, 분산, 표준편차
(Mean, Variance, Standard Deviation of Frequency Distribution)

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Mean, Variance, Standard Deviation of Frequency Distribution

▸ Start

x_i	f_i	$x_i f_i$
x_1	f_1	$x_1 f_1$
$\vdots$	$\vdots$	$\vdots$
x_n	f_n	$x_n f_n$

Start

x_i	f_i	$x_i f_i$
x_1	f_1	$x_1 f_1$
$\vdots$	$\vdots$	$\vdots$
x_n	f_n	$x_n f_n$

$$f_1 + f_2 + f_3 + \cdots + f_n$$

Start

x_i	f_i	$x_i f_i$
x_1	f_1	$x_1 f_1$
$\vdots$	$\vdots$	$\vdots$
x_n	f_n	$x_n f_n$

$$f_1 + f_2 + f_3 + \cdots + f_n = \sum_{i=1}^{n} f_i$$

Start

x_i	f_i	$x_i f_i$
x_1	f_1	$x_1 f_1$
$\vdots$	$\vdots$	$\vdots$
x_n	f_n	$x_n f_n$

$$f_1 + f_2 + f_3 + \cdots + f_n = \sum_{i=1}^{n} f_i = N$$

Start

x_i	f_i	$x_i f_i$
x_1	f_1	$x_1 f_1$
$\vdots$	$\vdots$	$\vdots$
x_n	f_n	$x_n f_n$

$$f_1 + f_2 + f_3 + \cdots + f_n = \sum_{i=1}^{n} f_i = N$$

Mean :

Start

x_i	f_i	$x_i f_i$
x_1	f_1	$x_1 f_1$
$\vdots$	$\vdots$	$\vdots$
x_n	f_n	$x_n f_n$

$$f_1 + f_2 + f_3 + \cdots + f_n = \sum_{i=1}^{n} f_i = N$$

Mean : m

Start

x_i	f_i	x_if_i
x_1	f_1	x_1f_1
$\vdots$	$\vdots$	$\vdots$
x_n	f_n	x_nf_n

$$f_1 + f_2 + f_3 + \cdots + f_n = \sum_{i=1}^{n} f_i = N$$

$$\text{Mean} \quad : \quad m = \frac{\displaystyle\sum_{i=1}^{n} x_if_i}{\displaystyle\sum_{i=1}^{n} f_i}$$

Start

x_i	f_i	$x_i f_i$
x_1	f_1	$x_1 f_1$
$\vdots$	$\vdots$	$\vdots$
x_n	f_n	$x_n f_n$

$$f_1 + f_2 + f_3 + \cdots + f_n = \sum_{i=1}^{n} f_i = N$$

$$\text{Mean} \quad : \quad m = \frac{\sum_{i=1}^{n} x_i f_i}{\sum_{i=1}^{n} f_i} = \frac{1}{N}$$

Start

x_i	f_i	$x_i f_i$
x_1	f_1	$x_1 f_1$
$\vdots$	$\vdots$	$\vdots$
x_n	f_n	$x_n f_n$

$$f_1 + f_2 + f_3 + \cdots + f_n = \sum_{i=1}^{n} f_i = N$$

$$\text{Mean} \quad : \quad m = \frac{\sum_{i=1}^{n} x_i f_i}{\sum_{i=1}^{n} f_i} = \frac{1}{N} \sum_{i=1}^{n} x_i f_i$$

Start

x_i	f_i	$x_i f_i$
x_1	f_1	$x_1 f_1$
$\vdots$	$\vdots$	$\vdots$
x_n	f_n	$x_n f_n$

$$f_1 + f_2 + f_3 + \cdots + f_n = \sum_{i=1}^{n} f_i = N$$

Mean : $$m = \frac{\sum_{i=1}^{n} x_i f_i}{\sum_{i=1}^{n} f_i} = \frac{1}{N} \sum_{i=1}^{n} x_i f_i$$

Variance :

▸ Start

x_i	f_i	x_if_i
x_1	f_1	x_1f_1
$\vdots$	$\vdots$	$\vdots$
x_n	f_n	x_nf_n

$$f_1 + f_2 + f_3 + \cdots + f_n = \sum_{i=1}^{n} f_i = N$$

$$\text{Mean} \quad : \quad m = \frac{\displaystyle\sum_{i=1}^{n} x_if_i}{\displaystyle\sum_{i=1}^{n} f_i} = \frac{1}{N}\sum_{i=1}^{n} x_if_i$$

$$\text{Variance} \quad : \quad \sigma^2$$

Start

x_i	f_i	$x_i f_i$
x_1	f_1	$x_1 f_1$
$\vdots$	$\vdots$	$\vdots$
x_n	f_n	$x_n f_n$

$$f_1 + f_2 + f_3 + \cdots + f_n = \sum_{i=1}^{n} f_i = N$$

$$\text{Mean} \quad : \quad m = \frac{\displaystyle\sum_{i=1}^{n} x_i f_i}{\displaystyle\sum_{i=1}^{n} f_i} = \frac{1}{N} \sum_{i=1}^{n} x_i f_i$$

$$\text{Variance} \quad : \quad \sigma^2 = \frac{\displaystyle\sum_{i=1}^{n} (x_i - m)^2 f_i}{\displaystyle\sum_{i=1}^{n} f_i}$$

Start

x_i	f_i	$x_i f_i$
x_1	f_1	$x_1 f_1$
$\vdots$	$\vdots$	$\vdots$
x_n	f_n	$x_n f_n$

$$f_1 + f_2 + f_3 + \cdots + f_n = \sum_{i=1}^{n} f_i = N$$

Mean : $$m = \frac{\sum_{i=1}^{n} x_i f_i}{\sum_{i=1}^{n} f_i} = \frac{1}{N} \sum_{i=1}^{n} x_i f_i$$

Variance : $$\sigma^2 = \frac{\sum_{i=1}^{n} (x_i - m)^2 f_i}{\sum_{i=1}^{n} f_i} = \frac{1}{N} \sum_{i=1}^{n} (x_i - m)^2 f_i$$

Start

x_i	f_i	$x_i f_i$
x_1	f_1	$x_1 f_1$
$\vdots$	$\vdots$	$\vdots$
x_n	f_n	$x_n f_n$

$$f_1 + f_2 + f_3 + \cdots + f_n = \sum_{i=1}^{n} f_i = N$$

$$\text{Mean} \quad : \quad m = \frac{\displaystyle\sum_{i=1}^{n} x_i f_i}{\displaystyle\sum_{i=1}^{n} f_i} = \frac{1}{N} \sum_{i=1}^{n} x_i f_i$$

$$\text{Variance} \quad : \quad \sigma^2 = \frac{\displaystyle\sum_{i=1}^{n} (x_i - m)^2 f_i}{\displaystyle\sum_{i=1}^{n} f_i} = \frac{1}{N} \sum_{i=1}^{n} (x_i - m)^2 f_i = \frac{1}{N} \sum_{i=1}^{n} x_i^2 f_i$$

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x_i	f_i	$x_i f_i$
x_1	f_1	$x_1 f_1$
$\vdots$	$\vdots$	$\vdots$
x_n	f_n	$x_n f_n$

$$f_1 + f_2 + f_3 + \cdots + f_n = \sum_{i=1}^{n} f_i = N$$

$$\text{Mean} \quad : \quad m = \frac{\sum_{i=1}^{n} x_i f_i}{\sum_{i=1}^{n} f_i} = \frac{1}{N}\sum_{i=1}^{n} x_i f_i$$

$$\text{Variance} \quad : \quad \sigma^2 = \frac{\sum_{i=1}^{n} (x_i - m)^2 f_i}{\sum_{i=1}^{n} f_i} = \frac{1}{N}\sum_{i=1}^{n} (x_i - m)^2 f_i = \frac{1}{N}\sum_{i=1}^{n} x_i^2 f_i - m^2$$

Start

x_i	f_i	$x_i f_i$
x_1	f_1	$x_1 f_1$
$\vdots$	$\vdots$	$\vdots$
x_n	f_n	$x_n f_n$

$$f_1 + f_2 + f_3 + \cdots + f_n = \sum_{i=1}^{n} f_i = N$$

Mean : $m = \dfrac{\sum_{i=1}^{n} x_i f_i}{\sum_{i=1}^{n} f_i} = \dfrac{1}{N} \sum_{i=1}^{n} x_i f_i$

Variance : $\sigma^2 = \dfrac{\sum_{i=1}^{n} (x_i - m)^2 f_i}{\sum_{i=1}^{n} f_i} = \dfrac{1}{N} \sum_{i=1}^{n} (x_i - m)^2 f_i = \dfrac{1}{N} \sum_{i=1}^{n} x_i^2 f_i - m^2$

Standard Deviation

▸ Start

x_i	f_i	$x_i f_i$
x_1	f_1	$x_1 f_1$
$\vdots$	$\vdots$	$\vdots$
x_n	f_n	$x_n f_n$

$$f_1 + f_2 + f_3 + \cdots + f_n = \sum_{i=1}^{n} f_i = N$$

Mean : $m = \dfrac{\sum_{i=1}^{n} x_i f_i}{\sum_{i=1}^{n} f_i} = \dfrac{1}{N} \sum_{i=1}^{n} x_i f_i$

Variance : $\sigma^2 = \dfrac{\sum_{i=1}^{n} (x_i - m)^2 f_i}{\sum_{i=1}^{n} f_i} = \dfrac{1}{N} \sum_{i=1}^{n} (x_i - m)^2 f_i = \dfrac{1}{N} \sum_{i=1}^{n} x_i^2 f_i - m^2$

Standard Deviation : σ

Start

x_i	f_i	x_if_i
x_1	f_1	x_1f_1
$\vdots$	$\vdots$	$\vdots$
x_n	f_n	x_nf_n

$$f_1+f_2+f_3+\cdots+f_n=\sum_{i=1}^{n} f_i=N$$

Mean : $$m=\frac{\sum_{i=1}^{n} x_if_i}{\sum_{i=1}^{n} f_i}=\frac{1}{N}\sum_{i=1}^{n} x_if_i$$

Variance : $$\sigma^2=\frac{\sum_{i=1}^{n}(x_i-m)^2f_i}{\sum_{i=1}^{n} f_i}=\frac{1}{N}\sum_{i=1}^{n}(x_i-m)^2f_i=\frac{1}{N}\sum_{i=1}^{n} x_i^2f_i-m^2$$

Standard Deviation : $$\sigma=\sqrt{\sigma^2}$$

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