$ax_i + b$의 평균과 분산

(Mean and Variance of $ax_i + b$)

▸ Start

Mean and Variance of $ax_i + b$

Start

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

Mean and Variance of $ax_i + b$

▸ 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 m' of $ax_i + b$

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' of $ax_i + b$

m'

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' of $ax_i + b$

$$m' = \frac{\sum_{i=1}^{n} (ax_i + b) f_i}{\sum_{i=1}^{n} f_i}$$

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' of $ax_i + b$

$$m' = \frac{\displaystyle\sum_{i=1}^{n}(ax_i + b)f_i}{\displaystyle\sum_{i=1}^{n} f_i} = \frac{\displaystyle a\sum_{i=1}^{n} x_i f_i + b\sum_{i=1}^{n} f_i}{\displaystyle\sum_{i=1}^{n} f_i}$$

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' of $ax_i + b$

$$m' = \frac{\sum_{i=1}^{n}(ax_i + b)f_i}{\sum_{i=1}^{n} f_i} = \frac{a\sum_{i=1}^{n} x_if_i + b\sum_{i=1}^{n} f_i}{\sum_{i=1}^{n} f_i} = a \times \frac{\sum_{i=1}^{n} x_if_i}{\sum_{i=1}^{n} f_i}$$

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

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

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$$m' = \frac{\displaystyle\sum_{i=1}^{n}(ax_i + b)f_i}{\displaystyle\sum_{i=1}^{n} f_i} = \frac{a\displaystyle\sum_{i=1}^{n} x_if_i + b\sum_{i=1}^{n} f_i}{\displaystyle\sum_{i=1}^{n} f_i} = a \times \frac{\displaystyle\sum_{i=1}^{n} x_if_i}{\displaystyle\sum_{i=1}^{n} f_i} + b$$

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' of $ax_i + b$

$$m' = \frac{\sum_{i=1}^{n}(ax_i + b)f_i}{\sum_{i=1}^{n} f_i} = \frac{a\sum_{i=1}^{n} x_if_i + b\sum_{i=1}^{n} f_i}{\sum_{i=1}^{n} f_i} = a \times \frac{\sum_{i=1}^{n} x_if_i}{\sum_{i=1}^{n} f_i} + b = am + b$$

▸ 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

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$$m' = \frac{\displaystyle\sum_{i=1}^{n}(ax_i + b)f_i}{\displaystyle\sum_{i=1}^{n} f_i} = \frac{\displaystyle a\sum_{i=1}^{n} x_if_i + b\sum_{i=1}^{n} f_i}{\displaystyle\sum_{i=1}^{n} f_i} = a \times \frac{\displaystyle\sum_{i=1}^{n} x_if_i}{\displaystyle\sum_{i=1}^{n} f_i} + b = am + b$$

- Variance σ'^2 of $ax_i + b$

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' of $ax_i + b$

$$m' = \frac{\sum_{i=1}^{n}(ax_i + b)f_i}{\sum_{i=1}^{n} f_i} = \frac{a\sum_{i=1}^{n} x_if_i + b\sum_{i=1}^{n} f_i}{\sum_{i=1}^{n} f_i} = a \times \frac{\sum_{i=1}^{n} x_if_i}{\sum_{i=1}^{n} f_i} + b = am + b$$

- Variance σ'^2 of $ax_i + b$

σ'^2

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' of $ax_i + b$

$$m' = \frac{\displaystyle\sum_{i=1}^{n}(ax_i + b)f_i}{\displaystyle\sum_{i=1}^{n} f_i} = \frac{a\displaystyle\sum_{i=1}^{n} x_if_i + b\sum_{i=1}^{n} f_i}{\displaystyle\sum_{i=1}^{n} f_i} = a \times \frac{\displaystyle\sum_{i=1}^{n} x_if_i}{\displaystyle\sum_{i=1}^{n} f_i} + b = am + b$$

- Variance σ'^2 of $ax_i + b$

$$\sigma'^2 = \frac{\displaystyle\sum_{i=1}^{n}\{(ax_i + b) - (am + b)\}^2 f_i}{\displaystyle\sum_{i=1}^{n} f_i}$$

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' of $ax_i + b$

$$m' = \frac{\displaystyle\sum_{i=1}^{n}(ax_i + b)f_i}{\displaystyle\sum_{i=1}^{n} f_i} = \frac{a\displaystyle\sum_{i=1}^{n} x_i f_i + b\displaystyle\sum_{i=1}^{n} f_i}{\displaystyle\sum_{i=1}^{n} f_i} = a \times \frac{\displaystyle\sum_{i=1}^{n} x_i f_i}{\displaystyle\sum_{i=1}^{n} f_i} + b = am + b$$

- Variance σ'^2 of $ax_i + b$

$$\sigma'^2 = \frac{\displaystyle\sum_{i=1}^{n}\{(ax_i + b) - (am + b)\}^2 f_i}{\displaystyle\sum_{i=1}^{n} f_i} = a^2$$

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' of $ax_i + b$

$$m' = \frac{\sum_{i=1}^{n}(ax_i + b)f_i}{\sum_{i=1}^{n} f_i} = \frac{a\sum_{i=1}^{n} x_i f_i + b\sum_{i=1}^{n} f_i}{\sum_{i=1}^{n} f_i} = a \times \frac{\sum_{i=1}^{n} x_i f_i}{\sum_{i=1}^{n} f_i} + b = am + b$$

- Variance σ'^2 of $ax_i + b$

$$\sigma'^2 = \frac{\sum_{i=1}^{n}\{(ax_i + b) - (am + b)\}^2 f_i}{\sum_{i=1}^{n} f_i} = a^2 \times \frac{\sum_{i=1}^{n}(x_i - m)^2 f_i}{\sum_{i=1}^{n} f_i}$$

▸ 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' of $ax_i + b$

$$m' = \frac{\sum_{i=1}^{n} (ax_i + b) f_i}{\sum_{i=1}^{n} f_i} = \frac{a\sum_{i=1}^{n} x_i f_i + b\sum_{i=1}^{n} f_i}{\sum_{i=1}^{n} f_i} = a \times \frac{\sum_{i=1}^{n} x_i f_i}{\sum_{i=1}^{n} f_i} + b = am + b$$

- Variance σ'^2 of $ax_i + b$

$$\sigma'^2 = \frac{\sum_{i=1}^{n} \{(ax_i + b) - (am + b)\}^2 f_i}{\sum_{i=1}^{n} f_i} = a^2 \times \frac{\sum_{i=1}^{n} (x_i - m)^2 f_i}{\sum_{i=1}^{n} f_i} = a^2 \sigma^2$$

▸ 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' of $ax_i + b$

$$m' = \frac{\displaystyle\sum_{i=1}^{n}(ax_i + b)f_i}{\displaystyle\sum_{i=1}^{n} f_i} = \frac{\displaystyle a\sum_{i=1}^{n} x_if_i + b\sum_{i=1}^{n} f_i}{\displaystyle\sum_{i=1}^{n} f_i} = a \times \frac{\displaystyle\sum_{i=1}^{n} x_if_i}{\displaystyle\sum_{i=1}^{n} f_i} + b = am + b$$

- Variance σ'^2 of $ax_i + b$

$$\sigma'^2 = \frac{\displaystyle\sum_{i=1}^{n}\{(ax_i + b) - (am + b)\}^2 f_i}{\displaystyle\sum_{i=1}^{n} f_i} = a^2 \times \frac{\displaystyle\sum_{i=1}^{n}(x_i - m)^2 f_i}{\displaystyle\sum_{i=1}^{n} f_i} = a^2\sigma^2$$

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