A Dataset $X := \{x_1, \ldots, x_n\}$ when each element is shifted by a constant amount c is the same as the unshifted.

$$\mu = \frac{1}{N} \sum_{n=0}^{N} x_n$$

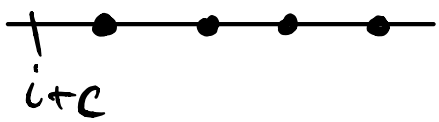
$$\text{var}(x) = \frac{1}{N} \sum_{n=0}^{N} (x_n - \mu)$$

Adding (1) to each element.

$$\mu_1 = \frac{1}{N} \sum_{n=0}^{N} (x_n + 1)$$

$$= \frac{1}{N} \left[\sum_{n=0}^{N} x_n + \sum_{n=0}^{N} (1) \right]$$

$$= \frac{1}{N} \sum_{n=0}^{N} x_n + \frac{N}{N}$$



$$= 1 + \frac{1}{N} \sum_{n=0}^{N} x_n$$

$$\text{Var}_1(x) = \frac{1}{N} \sum_{n=0}^{N} (x_n + 1 - \mu_1)$$

$$= \frac{1}{N} \sum_{n=0}^{N} \left[x_n + 1 - (1 + \mu) \right]$$

$$= \frac{1}{N} \sum_{n=0}^{N} (x_n + \mu)$$