1. Problem

From a very large population, a small sample of measurements was taken.

Please calculate the average absolute deviation using the following formula:

$$\mathsf{AAD} = \frac{\sum |x - \bar{x}|}{n}$$

Solution

We fill out the table column by column.

| X | $X - \bar{X}$ | $ x-ar{x} $ |
|------------------|------------------|----------------------------|
| 93 | -1.2 | 1.2 |
| 95 | 0.79999999999997 | 0.8 |
| 92 | -2.2 | 2.2 |
| 95 | 0.79999999999997 | 0.8 |
| 96 | 1.8 | 1.8 |
| ====== | ====== | ======= |
| $\sum x = 471$ | | $\sum x - \bar{x} = 6.8$ |
| $\bar{x} = 94.2$ | | |

We are ready for the formula.

$$s = \frac{\sum |x - \bar{x}|}{n}$$

$$=\frac{6.8}{5}$$

2. Problem

From a very large population, a small sample of measurements was taken.

Please calculate the (Bessel corrected) sample standard deviation using the following formula:

$$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}}$$

Solution

We fill out the table column by column.

| X | $X - \bar{X}$ | $(x-\bar{x})^2$ |
|-------------------|---------------|------------------------------|
| 113 | -3.5 | 12.25 |
| 113 | -3.5 | 12.25 |
| 113 | -3.5 | 12.25 |
| 127 | 10.5 | 110.25 |
| ====== | ======= | ======= |
| $\sum x = 466$ | | $\sum (x - \bar{x})^2 = 147$ |
| $\bar{x} = 116.5$ | | |

We are ready for the formula.

$$S = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}}$$
$$= \sqrt{\frac{147}{4 - 1}}$$
$$= \sqrt{49}$$
$$= \boxed{7}$$