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	4.8	4.8
86	-2.2	2.2
87	-1.2	1.2
92	3.8	3.8
83	-5.2	5.2
======	======	=======
$\sum x = 441$ $\bar{x} = 88.2$		$\sum x - \bar{x} = 17.2$

We are ready for the formula.

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

$$=\frac{17.2}{5}$$

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	$X - \bar{X}$	$(x-\bar{x})^2$
69	-9.5	90.25
87	8.5	72.25
89	10.5	110.25
69	-9.5	90.25
======	=======	=======
$\sum x = 314$		$\sum (x - \bar{x})^2 = 363$
$\bar{x} = 78.5$		

We are ready for the formula.

$$S = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}}$$
$$= \sqrt{\frac{363}{4 - 1}}$$
$$= \sqrt{121}$$
$$= \boxed{11}$$