

**1. Problem**

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

|     |     |     |     |
|-----|-----|-----|-----|
| 130 | 129 | 123 | 126 |
|-----|-----|-----|-----|

Please calculate the average absolute deviation using the following formula:

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

**Solution**

We fill out the table column by column.

| $x$             | $x - \bar{x}$ | $ x - \bar{x} $           |
|-----------------|---------------|---------------------------|
| 130             | 3             | 3                         |
| 129             | 2             | 2                         |
| 123             | -4            | 4                         |
| 126             | -1            | 1                         |
| =====           | =====         | =====                     |
| $\sum x = 508$  |               | $\sum  x - \bar{x}  = 10$ |
| $\bar{x} = 127$ |               |                           |

We are ready for the formula.

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

$$= \frac{10}{4}$$

$$= \boxed{2.5}$$

**2. Problem**

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

|    |    |    |    |    |    |
|----|----|----|----|----|----|
| 92 | 88 | 89 | 96 | 98 | 95 |
|----|----|----|----|----|----|

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.

| $x$            | $x - \bar{x}$ | $(x - \bar{x})^2$           |
|----------------|---------------|-----------------------------|
| 92             | -1            | 1                           |
| 88             | -5            | 25                          |
| 89             | -4            | 16                          |
| 96             | 3             | 9                           |
| 98             | 5             | 25                          |
| 95             | 2             | 4                           |
| =====          | =====         | =====                       |
| $\sum x = 558$ |               | $\sum (x - \bar{x})^2 = 80$ |
| $\bar{x} = 93$ |               |                             |

We are ready for the formula.

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

$$= \sqrt{\frac{80}{6 - 1}}$$

$$= \sqrt{16}$$

$$= \boxed{4}$$