

1. Problem

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

186	205	186	189	189	187	195
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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} $
186	-5	5
205	14	14
186	-5	5
189	-2	2
189	-2	2
187	-4	4
195	4	4
=====	=====	=====
$\sum x = 1337$		$\sum x - \bar{x} = 36$
$\bar{x} = 191$		

We are ready for the formula.

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

$$= \frac{36}{7}$$

$$= \boxed{5.1428571}$$

2. Problem

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

197	191	195	203
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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	$x - \bar{x}$	$(x - \bar{x})^2$
197	0.5	0.25
191	-5.5	30.25
195	-1.5	2.25
203	6.5	42.25
=====	=====	=====
$\sum x = 786$		$\sum (x - \bar{x})^2 = 75$
$\bar{x} = 196.5$		

We are ready for the formula.

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

$$= \sqrt{\frac{75}{4 - 1}}$$

$$= \sqrt{25}$$

$$= \boxed{5}$$