

# Mean Deviation

Goal:

- to calculate the mean deviation of a data set
- to interpret the mean deviation of a data set

Below are two data sets, representing grades on a test.

Group 1: 55, 60, 63, 75, 75, 87, 90, 95

Group 2: 55, 73, 74, 75, 75, 76, 77, 95

How do these two sets compare?

Range is the same =  $95 - 55 = 40$

Mode is the same = 75

Median is the same = 75

Mean is the same = 75

Group 1 is less consistent than Group 2.

Enter mean deviation.

The mean deviation of a data set is a measure of dispersion. It represents:

Measures of dispersion: Range, mean deviation  
Measures of central tendency: mean, mode, median

Mean deviation:

On average how far each data point is from the average.

The mean deviation is calculated by:

$$\text{Mean deviation} = \frac{\text{Sum of all the deviations from the mean (all positive)}}{\text{the number of values}}$$

Group 1: 55, 60, 63, 75, 75, 87, 90, 95

Group 2: 55, 73, 74, 75, 75, 76, 77, 95

Group 1: mean:  $\bar{X} = 75$

$$\begin{array}{l} \text{Deviations} = 75 - 55 = 20 \\ \text{from the} \quad 75 - 60 = 15 \\ \text{mean} \quad \quad 75 - 63 = 12 \\ \quad \quad \quad 75 - 75 = 0 \\ \quad \quad \quad 75 - 75 = 0 \\ \quad \quad \quad 87 - 75 = 12 \\ \quad \quad \quad 90 - 75 = 15 \\ \quad \quad \quad 95 - 75 = 20 \end{array}$$

$$\begin{aligned} \text{Mean deviation} &= \frac{20+15+12+0+0+12+15+20}{8} \\ &= 11.8 \end{aligned}$$

$$\begin{array}{l} \text{Group 2: } 75 - 55 = 20 \\ \quad \quad \quad 75 - 73 = 2 \\ \quad \quad \quad 75 - 74 = 1 \\ \quad \quad \quad 75 - 75 = 0 \\ \quad \quad \quad 75 - 75 = 0 \\ \quad \quad \quad 76 - 75 = 1 \\ \quad \quad \quad 77 - 75 = 2 \\ \quad \quad \quad 95 - 75 = 20 \end{array}$$

$$\begin{aligned} \text{Mean dev.} &= \frac{20+2+1+1+2+20}{8} \\ &= 5.75 \end{aligned}$$

Group 1: mean dev. = 11.8

Group 2: mean dev. = 5.8 The values  
in group 2 are  
closer to the mean  
on average  
(less spread out)

Homework:  
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