

Dispersion

14 14 14 14 18 18 18 18

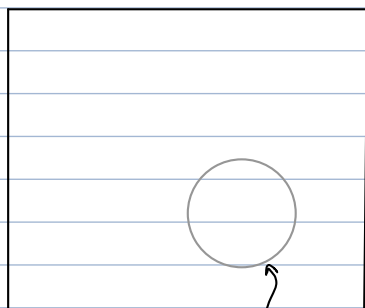
Mean: 16

Median: 16

16 16 16 16 16 16 16 16

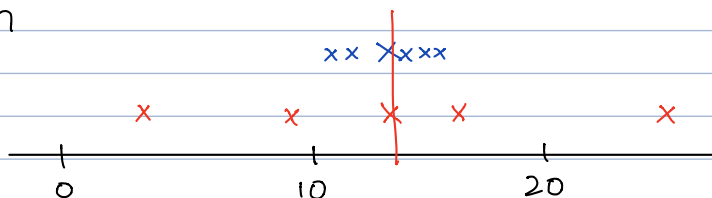
Mean: 16

Median: 16



Sample

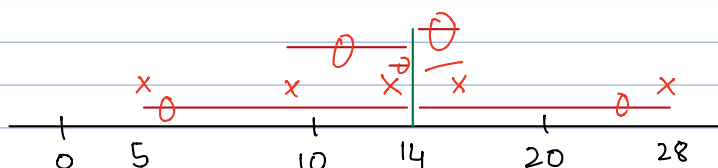
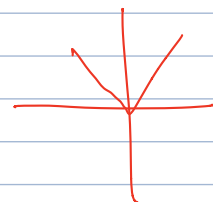
Population



"Dispersion"

"Average distance of values from mean"
 ↘ squared

$$\bar{x} = \left(\sum_i x_i \right) / N$$



xx xxx

$$(x_i - \bar{x})^2$$

$$28 - 14 = 14$$

$$5 - 14 = -9$$



$$14^2 = 196$$

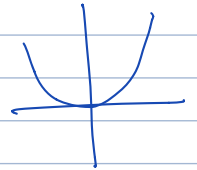
$$(-9)^2 = 81$$

|
|
|

$$\sigma^2 = \frac{\sum_{i=1}^N (x_i - \bar{x})^2}{N}$$

Annotations: "sigma" points to σ^2 ; "variance" points to σ^2 ; a red arrow points to \bar{x} in the formula.

Problem: Original data units: m
variance units: m^2



Solution: Square root!

$$\sigma = \sqrt{\sigma^2}$$

Standard Deviation:

"Square root of

average square distances of values from the mean"

"How far away are values from the mean..."

How large is SD?

Is 10.7 large?

How about 1094?

- Depends on the mean ...

$$\frac{10.7}{100} \times 100 = 10.7$$

$$\frac{1094}{100,000} \times 100 = 1.09$$

Coefficient of variation: $\frac{\sigma}{\bar{x}} * 100$

"Relative measure of deviation."