

VITAL MATHEMATICS



STATISTICS
STANDARD DEVIATION

STEVIE CARPENTER

INTRODUCTION

The standard deviation is a value that tells you how far all data values deviate from the mean. The standard deviation is never negative, but it can be zero or positive.

STANDARD DEVIATION EQUATION

$$s = \sqrt{\frac{\Sigma(x - \bar{x})}{n - 1}}$$

\bar{x} ($x - bar$) – Sample mean

Σ (Sigma) – Summation

x – Data value

n – Sample size

s – Sample standard deviation

$$\sigma = \sqrt{\frac{\Sigma(x - \mu)}{N}}$$

μ (mu) – Population mean

N – Population size

σ – Population standard deviation

SOLVING STANDARD DEVIATION

$$s = \sqrt{\frac{\Sigma(x - \bar{x})}{n - 1}} \qquad \sigma = \sqrt{\frac{\Sigma(x - \mu)}{N}}$$

STEP 1) Calculate the mean

$$\bar{x} = \frac{\Sigma x}{n} \qquad \mu = \frac{\Sigma x}{N}$$

STEP 2) Subtract each data value from the mean**STEP 3)** Add all values from STEP 2**STEP 4)** Divide STEP 3 by $(n - 1) / N$

Example: $\frac{STEP\ 3}{n - 1}$ (Sample) or $\frac{STEP\ 3}{N}$ (Population)

STEP 5) Find the square of STEP 4

Example: $\sqrt{STEP\ 4}$

STEP 6) Round answer two decimal places**STEP 7)** Provide Conclusion

STANDARD DEVIATION EXAMPLE

Example 1: Find the standard deviation speed of the following cars below:

25mph, 70mph, 40mph, 40mph, 63 mph, 89mph, 126mph

Example 2) Find the standard deviation age of the following people listed below:

17yrs, 25yrs, 19yrs, 36yrs, 55yrs, 22yrs, 45yrs, 11yrs, 47yrs

Concepts Concerning the Standard Deviation

The larger a standard deviation becomes, the more all data values deviate from the mean. The standard deviation is never negative, only zero if all values are the same or positive. The standard deviation uses the same units as the data values. Outliers can change the standard deviation drastically. The sample standard deviation is a biased estimator of the population standard deviation.



VITAL MATHEMATICS

BY

STEVIE CARPENTER

INSTA: VITALMATHEMATICS

FB PAGE: VITAL MATHEMATICS

YOUTUBE: VIITAL MATHEMATICS

