

Learning Objective: Standard Deviation

Starter

This is the mathematical formula to calculate the mean.

$$\bar{x} = \sum \frac{x_i}{n}$$

I can use the formula for Standard Deviation

I can calculate the standard deviation for discrete data and know what the value represents

I can interpret Standard deviations and draw conclusions on different sets of data.

Use your knowledge of how to calculate the mean to try and define each of the symbols

\bar{x} = Mean x_i = Values in data set

\sum = Sum of n = Number of terms

Key Words: Standard Deviation, Mean, Spread, Variance, Formula, Sigma

Learning Objective: Standard Deviation

Two NGOs MAC and APT are arguing over who sold the most SANITARY PADS in one week. Sales figures are below given to the nearest million, calculate the mean to help decide who sold the most.

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	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
MAC	1	1	1	4	8	8	5
APT	3	4	4	3	4	5	5

They both have the same mean!
4 million SANITARY PADS sold each day on average....
we need something else to determine whose sales are the best

Key Words: Standard Deviation, Mean, Spread, Variance, Formula, Sigma

$$\bar{x} = \sum \frac{x_i}{n}$$

Learning Objective: Standard Deviation

The standard deviation measures the spread of the set of numbers, in effect the average distance of each number from the mean.

The bigger the standard deviation, the bigger the spread of the numbers.

A smaller standard deviation implies the numbers are closer together.

Here's the formula....

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

$$\bar{x} = \sum \frac{x_i}{n}$$

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Success Criteria

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sum of

each number

mean

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

how many numbers are in the set

Standard Deviation

Key Words: Standard Deviation, Mean, Spread, Variance, Formula, Sigma

$$\bar{x} = \sum \frac{x_i}{n}$$

First SERIES 'X'
denotes sales of
Sanitary pads by
NGO - MAC

Learning Objective: Standard Deviation

x_i	$x_i - \bar{x}$	$(x_i - \bar{x})^2$
1	-3	9
1	-3	9
1	-3	9
4	0	0
8	4	16
8	4	16
5	1	1
		60

$$\bar{x} = 4$$

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Standard Deviation

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value represents

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Standard
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draw conclusions
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data.

$$60 \div (n-1) = 60 \div 6 = 10$$

$$\sqrt{10} = \mathbf{3.16 \quad (2dp)}$$

Key Words: Standard Deviation, Mean, Spread, Variance, Formula, Sigma

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

$$\bar{x} = \sum \frac{x_i}{n}$$

Learning Objective: Standard Deviation

First SERIES 'Y'
denotes sales of
Sanitary pads by
NGO - APT

Success Criteria

I can use the
formula for
Standard Deviation

I can calculate the
standard deviation
for discrete data
and know what the
value represents

I can interpret
Standard
deviations and
draw conclusions
on different sets of
data.

Y_i	$Y_i - \bar{Y}$	$(Y_i - \bar{Y})^2$
3	-1	1
4	0	0
4	0	0
3	-1	1
4	0	0
5	1	1
5	1	1
		4

$$\bar{Y} = 4$$

$$4 \div (n-1) = 4 \div 6 = 0.666666$$

$$\sqrt{0.666..} = \mathbf{0.82 \quad (2dp)}$$

Key Words: Standard Deviation, Mean, Spread, Variance, Formula, Sigma

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

$$\bar{x} = \sum \frac{x_i}{n}$$

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Success Criteria

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MAC $\bar{x} = 4$ $\sigma = 3.16$

How can we interpret this?

APT $\bar{y} = 4$ $\sigma = 0.82$ $\bar{x} = 4$

They both have the same mean but APT's sales are less spread about the mean.

You could say that APT's sales are more consistent

Key Words: Standard Deviation, Mean, Spread, Variance, Formula, Sigma