# Standard deviation and measures of spread

## Learn and practise | Free preview

A sample from this topic. The complete topic collection contains three different resources and worked solutions.

Read the explanation and worked example. Show your working; use a calculator only where asked.

## What you will practise

• Compare distributions using standard deviation, quantiles and other measures of spread.

• Explain a method and check the reasonableness of a result.

Useful starting skills: Use the prerequisite operations and representations shown in the worked example.

In these exercises, treat each stated data list as the whole population. Find its mean, square each deviation from that mean, average the squared deviations using divisor n, then take the square root. This population standard deviation has the same units as the original data. A sample standard deviation uses a different divisor, n-1, and must be labelled.

Standard deviation gives large deviations substantial weight. The interquartile range describes the middle half and is less affected by extreme values. Mean absolute deviation averages distances from the mean; median absolute deviation is the median of distances from the median. Percentiles and cumulative frequencies locate observations within an ordered distribution.

## Worked example

Find the population standard deviation of 2, 2, 6, 6.

The mean is 4. Deviations are -2, -2, 2, 2.

Squared deviations sum to 16; divide by 4 to get variance 4.

Take the square root.

Answer: Population standard deviation 2

## Try it yourself

Name: _____ Date: _____

1. Find the mean and population standard deviation of 1, 3, 5, 7.

2. Find the population standard deviation of 8, 8, 8, 8.

## Answers and explanations

Check the method as well as the final answer. An alternative correct method is also valid.

1. Mean 4; standard deviation $\sqrt{5}$

Squared deviations are 9,1,1,9; average 20/4=5.

2. 0

Every value equals the mean, so every deviation is zero.

Curriculum reference: VC2M10AST01; VC2M10AST02

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