

Hypothesis testing

O1 Extend AS content to correlation coefficients as measures of how close data points lie to a straight line and be able to interpret a given correlation coefficient using a given p-value or critical value (calculation of correlation coefficients is excluded).

O3 Conduct a statistical hypothesis test for the mean of a Normal distribution with known, given or assumed variance and interpret the results in context.

For a brief commentary on this content go to the [MEI outline SoW](#).

Pre-requisites

- AS Data processing, presentation & interpretation
- AS Hypothesis testing
- A level Probability distributions

Teaching it!

- **Coming soon**** A series of [videos](#) designed to support students on this topic.
- [Correlation game](#): A game building understanding of scatter diagrams and correlation value.
- [Hypothesis testing for the mean of a Normal distribution](#): Interactive GeoGebra applet.
- [Correlation & hypothesis testing](#): Interactive Geogebra applet.
- [Hypothetical shorts](#): Nrich task looking at True/False statements about hypothesis testing.
- [Very old man](#): Scenario from Nrich about making & testing statistical hypotheses.

Common student errors

- Thinking that a p-value tells you how likely the null hypothesis is.
- Using the parent population's standard deviation rather than the standard error (in effect using $n = 1$ when the sample is larger).
- Confusing a sample statistic with a population parameter.

Getting them thinking

- Present a scatter diagram with a small number of points – add a point to increase correlation (or to decrease correlation) (or remove a point).
- Two variables have positive correlation – what effect does adding an outlier have – does it always sometimes or never decrease the correlation?
- Think of two variables where you would expect there to be a correlation but there is no causal relationship
- Show two overlapping Normal curves with equal variance but different means– one is distribution under null hypothesis, other is actual distribution – what values of $\bar{x}$ cause acceptance/rejection of null hypothesis? What happens as the mean of the actual distribution gets nearer to/further from the hypothesised mean?