Significance Testing

Mathematics

The frequentist test in order, with what a p-value does and does not say.

The standard test, in the order it must be done.

1. **State both hypotheses**
   H_0 is the specific claim; H_1 names the departure you want to detect.

2. **Fix the level in advance**
   α is chosen before the data are seen, never after inspecting p.

3. **Compute the test statistic**
   Standardise the estimate on the assumption that H_0 is true.

4. **Find the p-value**
   The chance of a statistic this extreme or worse if H_0 holds.

5. **Compare and report**
   $p < \alpha$ rejects H_0. Otherwise you fail to reject; you never accept it.

p is not the probability that H_0 is true. The 0.05 threshold is a convention, and a contested one. Educational reference.