📄 **05-anova-basics.md**

ANOVA (Analysis of Variance)

Definition

ANOVA is a statistical technique used to determine whether the means of three or more groups are significantly different.

Why ANOVA is used

Using multiple t-tests increases error. ANOVA compares all groups at once.

When to Use ANOVA

- Comparing three or more groups

- Data is numeric

- Groups are categorical

Types of ANOVA

1. One-Way ANOVA – One independent variable

2. Two-Way ANOVA – Two independent variables

3. Repeated Measures ANOVA – Same subjects measured multiple times

Assumptions

- Normal distribution

- Equal variance

- Independent observations

- Random sampling

Hypothesis

- **H_0:** All means are equal

- **H_1:** At least one mean is different

Key Point for Revision

ANOVA tells IF a difference exists, not WHERE.