A researcher wants to test whether a new teaching method improves student performance. A random sample of 50 students is divided into two groups: one group taught using the new method and the other using the traditional method. The average test scores of the two groups are compared.

State the null and alternative hypotheses for this study. Data:

Sample size (n) = 50, Test scores of the two groups Explanation: In this problem, we are interested in comparing the means of two groups (new method vs. traditional method).

The null hypothesis (H0) states that there is no significant difference between the means, while the alternative hypothesis (Ha) suggests that there is a significant difference

Lets

* μnew = population mean score with the **new** method
* μtrad = population mean score with the **traditional** method

**If you’re specifically testing for improvement (one-tailed):**

* **Null H0:** μnew ≤ μtrad
* **Alternative Ha:** μnew > μtrad

**If you just want to test for any difference (two-tailed):**

* **Null H0:** μnew = μtrad
* **Alternative Ha:** μnew ≠ μtrad

(typically use an independent two-sample t-test Welch’s version if variances aren’t equal.)