

Chapter 14 / Example 9

Two-sample t -test

Mr Arthur gives his two chemistry groups the same test. He wants to find out if there is any difference between the achievement levels of the two groups.

The results are:

| | | | | | | | | | | | | | | |
|----------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Group 1 | 54 | 62 | 67 | 43 | 85 | 69 | 73 | 81 | 47 | 92 | 55 | 59 | 68 | 72 |
| Group 2 | 73 | 67 | 58 | 46 | 91 | 48 | 82 | 81 | 67 | 74 | 57 | 66 | | |

- Write down the null and alternative hypotheses.
- Perform a t -test at the 5% significance level.
- Write down the conclusion to the test.

Press **MENU** 2 **STAT** to display the List Editor screen.

Type the Group 1 scores in the first column.

Press **EXE** after each number to move to the next cell.

Note: If the list contains other numbers, you can clear it by pressing **F4** DEL-ALL.

| | List 1 | List 2 | List 3 | List 4 |
|-----|--------|--------|--------|---|
| SUB | | | | |
| 1 | 54 | | | |
| 2 | 62 | | | |
| 3 | 67 | | | |
| 4 | 43 | | | |
| | | | | 43 |
| | | | | GRAPH CALC TEST INTR DIST ▶ |

Press **▶** to move to the next column.

Enter the Group 2 scores in the second column.

| | List 1 | List 2 | List 3 | List 4 |
|-----|--------|--------|--------|---|
| SUB | | | | |
| 1 | 54 | 73 | | |
| 2 | 62 | 67 | | |
| 3 | 67 | 58 | | |
| 4 | 43 | 46 | | |
| | | | | 46 |
| | | | | GRAPH CALC TEST INTR DIST ▶ |

To calculate the p -value press **F3** TEST **F2** t **F2** 2-SAMPLE

Choose Data: **F1** List

| | |
|-----------------------|----------------|
| 2-Sample tTest | |
| Data | :List |
| $\mu 1$ | : $\neq \mu 2$ |
| List(1) | :List1 |
| List(2) | :List2 |
| Freq(1) | :1 |
| Freq(2) | :1 |
| List | Var |

F1 $\mu \neq \mu_0$

F1 Pooled: On

Press **EXE**.

| | |
|-----------------------|----------------|
| 2-Sample tTest | |
| $\mu 1$ | : $\neq \mu 2$ |
| List(1) | :List1 |
| List(2) | :List2 |
| Freq(1) | :1 |
| Freq(2) | :1 |
| Pooled | :On |
| On | Off |

p -value = 0.816

0.816 > 0.05, not significant so no reason to reject the null hypothesis that there is no significant difference between the two groups.

| | |
|-----------------------|-------------|
| 2-Sample tTest | |
| t | =-0.2349643 |
| p | =0.81622956 |
| df | =24 |
| $\bar{x}1$ | =66.2142857 |
| $\bar{x}2$ | =67.5 |
| $sx1$ | =14.0886128 |