

### 1. Problem

The waiting time (in minutes) at the cashier of two supermarket chains with different cashier systems is compared. The following statistical test was performed:

Two Sample t-test

data: Waiting by Supermarket

t = 4.1777, df = 108, p-value = 2.996e-05

alternative hypothesis: true difference in means between group Sparag and group Consumo is g  
95 percent confidence interval:

1.241878          Inf

sample estimates:

mean in group Sparag    mean in group Consumo

5.419987                      3.360063

Which of the following statements are correct? (Significance level 5%)

- (a) The absolute value of the test statistic is larger than 1.96.
- (b) A one-sided alternative was tested.
- (c) The p-value is larger than 0.05.
- (d) The test shows that the waiting time is longer at Sparag than at Consumo.
- (e) The test shows that the waiting time is shorter at Sparag than at Consumo.

### Solution

- (a) True. The absolute value of the test statistic is equal to 4.178.
- (b) True. The test aims at showing that the difference of means is larger than 0.
- (c) False. The p-value is equal to 3e-05.
- (d) True. The test result is significant ( $p < 0.05$ ) and hence the alternative is shown that the difference of means is larger than 0.
- (e) False. The test aims at showing that the waiting time at Sparag is longer than at Consumo.