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Pizza F-Test Analysis Report

Research Objective: You and some of your friends have decided to test the validity of an advertisement by a local pizza restaurant, which claims it delivers to the dormitories faster than a local branch operated by a national chain. Both the local pizza restaurant and the national chain are located across the street from your college campus. The variable of interest is delivery time in minutes from the time the pizza is ordered to when it is delivered. You collect the data ordering 16 pizzas from local pizza restaurant and 16 from the national chain at different times. The following table is the record of the delivery times:

At the .05 level of significance, is there any evidence that the mean delivery time the local pizza restaurant in less than the mean delivery time for the national chain?

Local (Delivery time in minutes)		National Chain (Delivery time in minutes)	
16.8	11.7	22.0	19.5
18.1	14.1	15.2	17.0
15.6	21.8	18.7	19.5
16.7	13.9	15.6	16.5
17.5	20.8	20.8	24.0
18.2	21.5	19.7	23.0
19.2	12.2	21.2	16.7
13.7	11.4	23.9	17.5

Problem Definition –

Calculate which t-test formula to use.

Hypothesis –

H_0: $\sigma_L^2 \leq \sigma_N^2$

H_1: $\sigma_L^2 > \sigma_N^2$

Decision Rule –

If F critical ratio exceeds 2.40 reject the null hypothesis.

Test –

Method	Test Statistic	DF1	DF2	P-Value
F	1.40	15	15	0.260

Conclusion –

1) The f test statistic of 1.40 is less than the critical value of 2.40. Fail to reject the null hypothesis, a Type 2 beta error could have been made.
2) P-value of 0.260 is > α .05 = Fail to reject null.

Interpretation –

The variance for the local pizza restaurant and national chain pizza are not significantly different and as such we may use pooled variance t test. Use case 2.