One-Way Analysis of Variance

is used to determine if the means for more than two populations are all equal

State hypothesis
H_0: All of the population means are equal
H_1: Not all of the population means are equal

Use $\alpha = 0.05$
(unless stated otherwise)

Enter the sample from population 1 into L_1
Enter the sample from population 2 into L_2
⋮
Enter the sample from population m into L_m

ANOVA(L_1,L_2, … L_m)

Decision:

Reject H_0 when p-value ≤ α

Otherwise do not reject H_0

State conclusion

Linear Regression Analysis

is used to predict one variable based on the linear relationship with another

Enter the predictor data (x_i) into L_1
Enter the predicted data (y_i) into L_2

LinReg(ax+b) L_1,L_2

The linear regression model that will best predict y based on x is

$$\hat{y} = ax + b$$

where a is the slope
and b is the y-intercept

It is appropriate to use the linear regression model to make predictions when the coefficient of determination r^2 is close to 1. When r^2 is close to 1, the linear regression model fits the sample data very well.

The Chi-Squared Goodness-of-Fit Test

is used to determine if the expected frequencies fit the observed frequencies

State hypothesis
H_0: All of the expected frequencies fit the observed frequencies
H_1: Not all of the expected frequencies fit the observed frequencies

Use $\alpha = 0.05$
(unless stated otherwise)

Enter the observed frequencies (data) in L_1
Enter the expected frequencies ($n \cdot p_i$) in L_2

X^2GOF-Test
with df = c - 1

Decision:

Reject H_0 when p-value ≤ α

Otherwise do not reject H_0

State conclusion

The Chi-Squared Test for Independence

is used to determine whether two events are independent of one another

State hypothesis
H_0: The events are independent
H_1: The events are not independent

Use $\alpha = 0.05$
(unless stated otherwise)

Enter the observed frequencies (data) into an r×c matrix

X^2-Test
with df = (c - 1)·(r - 1)

Decision:

Reject H_0 when p-value ≤ α

Otherwise do not reject H_0

State conclusion