

Statistics Using Excel Workshop

Presented by the QSC

1. Define the observation.

2. Define each variable as Numeric/Quantitative or Categorical/Qualitative (Circle One)

- | | |
|---------------------|---|
| a. Extracurriculars | Numeric/Quantitative or Categorical/Qualitative |
| b. Motivation Level | Numeric/Quantitative or Categorical/Qualitative |
| c. Gender | Numeric/Quantitative or Categorical/Qualitative |
| d. Exam Score | Numeric/Quantitative or Categorical/Qualitative |

3. For each descriptive statistic, select which type of variable needed (Circle One)

- | | |
|--------------------------|---|
| a. Mean/Average | Numeric/Quantitative or Categorical/Qualitative |
| b. Median | Numeric/Quantitative or Categorical/Qualitative |
| c. Mode | Numeric/Quantitative or Categorical/Qualitative |
| d. Frequency/Proportions | Numeric/Quantitative or Categorical/Qualitative |
| e. Standard Deviation | Numeric/Quantitative or Categorical/Qualitative |
| f. Min, Max, Q1, Q3 | Numeric/Quantitative or Categorical/Qualitative |

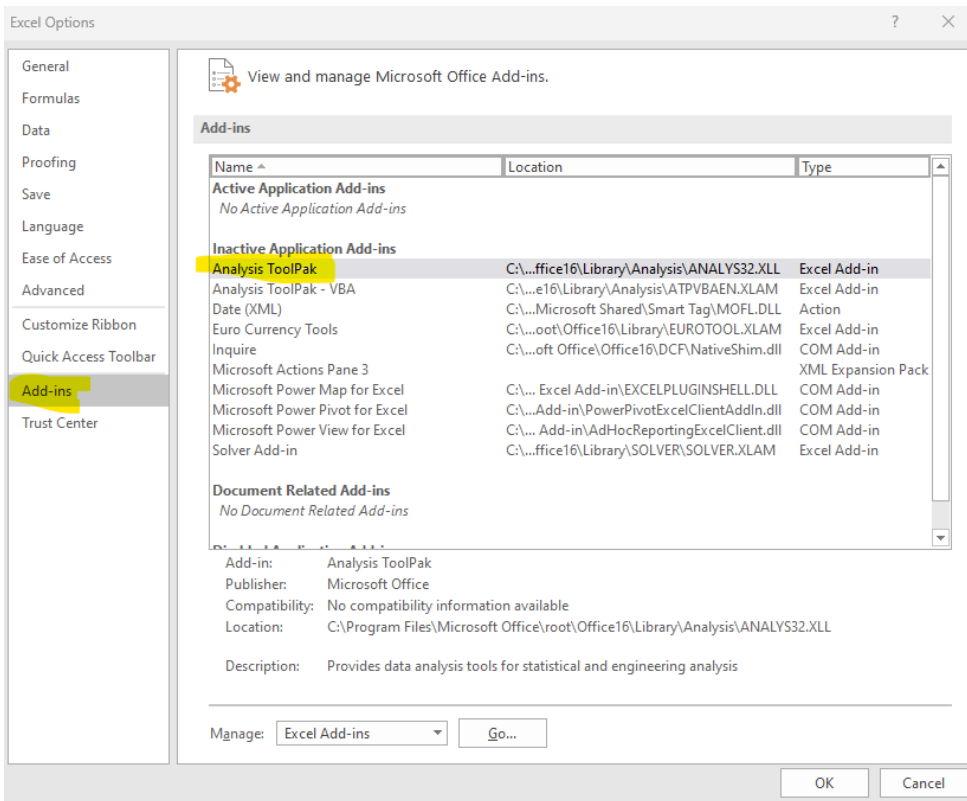
4. Install the Data Analysis Tool Pack

Step 1: Click the File Tab on the top left

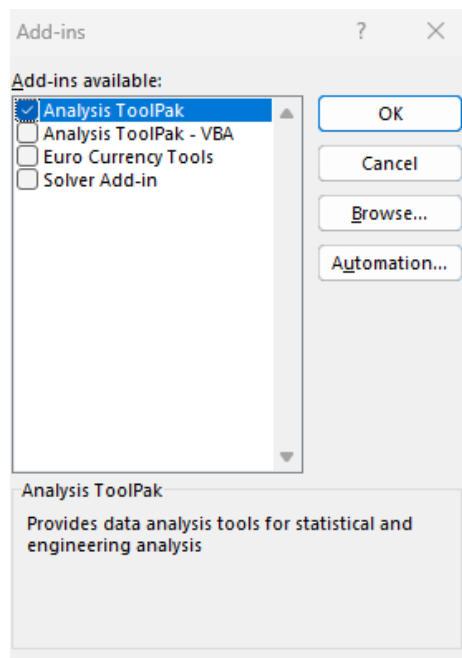
Step 2: Click Options on the bottom left

Step 3: Click Add-Ins

Step 4: Select Analysis ToolPak and click GO



Step 5: Check Analysis ToolPak and select OK. The ToolPak will now be available under the Data tab.



6. Run a descriptive statistics analysis for Exam Score.
 - a. What was the average test score?
 - b. What was the lowest test score?
 - c. What was the median test score?
 - d. Comparing the median and mean, what can you say about the shape of this distribution?
7. If we want to compare two groups, we can use a t-test. For estimators for **categorical/qualitative** variables, we use **proportions**. For estimators for **numeric/quantitative variables**, we use **means**.
 - a. Recall the steps of hypothesis test:
8. Conduct a hypothesis test to see if there is a difference in exam scores of people who participated in extracurriculars vs those who did not.
 - a. Start by reorganizing the data. Copy Column A (Extracurriculars) and Column D (Exam Score) to a new sheet. Label this sheet "T-Test."
 - b. Sort data by Extracurriculars.
 - c. Create two new columns: "Yes" and "No"
 - d. Copy the test scores into the appropriate columns.

e. Run an F-Test of equal variances. State your hypothesis, test statistic, p-value, and conclusion.

f. Based on your results in part e, run a T-Test. Include all steps. State your conclusion in context to the data.

9. T-Tests can compare differences between two groups. To compared differences between more than 2 groups, ANOVA can be used. Use ANOVA to test if there is a difference in exam scores for students with different levels of motivation: Low, Medium, and High.
 - a. Run an ANOVA: Single Factor test. Include all steps. State your conclusion in context to the data.

10. To compare the relationship/dependence of two categorical variables, use a Chi-Squared test.
- Using the “Chi-Square” sheet, conduct a hypothesis test to see if there is a relationship between gender and motivation. Include all steps. State your conclusion in context to the data.

$$E_i = \frac{\text{Row Total} * \text{Column Total}}{\text{Table Total}}$$

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

$$df = (\text{number of rows} - 1)(\text{number of columns} - 1)$$