

[Data Analysis in Excel] {CheatSheet}

1. Basic Excel Operations

- **AutoFill:** Drag the fill handle (small square in the bottom right of a cell) to fill cells.
- **Filtering Data:** Select the range → Data → Filter.
- **Sorting Data:** Select the range → Data → Sort.

2. Excel Functions for Basic Arithmetic

- **SUM:** `=SUM(A1:A10)` - Adds all numbers in a range.
- **AVERAGE:** `=AVERAGE(B1:B10)` - Calculates the average of numbers in a range.
- **MIN:** `=MIN(C1:C10)` - Finds the smallest number in a range.
- **MAX:** `=MAX(D1:D10)` - Finds the largest number in a range.
- **SUBTOTAL:** `=SUBTOTAL(1, E1:E10)` - Calculates the sum of a range, ignoring filters.

3. Date and Time Functions

- **TODAY:** `=TODAY()` - Returns the current date.
- **NOW:** `=NOW()` - Returns the current date and time.
- **YEAR:** `=YEAR(F1)` - Extracts the year from a date.
- **MONTH:** `=MONTH(G1)` - Extracts the month from a date.
- **DAY:** `=DAY(H1)` - Extracts the day of the month from a date.

4. Text Functions

- **CONCATENATE/CONCAT:** `=CONCATENATE(A1, B1)` or `=CONCAT(A1, B1)` - Joins two or more text strings.
- **LEFT:** `=LEFT(I1, 3)` - Extracts a given number of characters from the start of a string.
- **RIGHT:** `=RIGHT(J1, 3)` - Extracts a given number of characters from the end of a string.
- **MID:** `=MID(K1, 2, 4)` - Extracts a substring from the middle of a string.

- **UPPER/LOWER/PROPER:** =UPPER(L1), =LOWER(L1), =PROPER(L1) - Changes text to upper, lower, or proper case.

5. Logical Functions

- **IF:** =IF(M1>10, "Yes", "No") - Performs a logical test and returns one value for TRUE and another for FALSE.
- **AND/OR:** =AND(N1>5, O1<10), =OR(P1=1, Q1=2) - Returns TRUE if all or any of the arguments respectively are TRUE.
- **NOT:** =NOT(R1) - Reverses the logic of its argument.
- **IFERROR:** =IFERROR(S1, "Error") - Returns a custom result if an error occurs in the formula.

6. Lookup and Reference Functions

- **VLOOKUP:** =VLOOKUP(T1, A1:B10, 2, FALSE) - Looks for a value in the first column of a table and returns a value in the same row.
- **HLOOKUP:** =HLOOKUP(U1, A1:C3, 2, FALSE) - Looks for a value in the first row of a table.
- **INDEX:** =INDEX(A1:C10, 3, 2) - Returns the value of a cell in a specified row and column number.
- **MATCH:** =MATCH("item", A1:A10, 0) - Returns the relative position of an item in a range.
- **XLOOKUP** (for newer Excel versions): =XLOOKUP(V1, A1:A10, B1:B10) - Searches a range for a match and returns the corresponding item from a second range.

7. Financial Functions

- **PMT:** =PMT(rate, nper, pv) - Calculates the payment for a loan based on constant payments and a constant interest rate.
- **FV:** =FV(rate, nper, pmt) - Calculates the future value of an investment.
- **NPV:** =NPV(rate, value1, [value2], ...) - Calculates the net present value of an investment.
- **IRR:** =IRR(values) - Calculates the internal rate of return for a series of cash flows.

- **XNPV** (for non-periodic cash flows): `=XNPV(rate, values, dates)`

8. Statistical Functions

- **COUNT/COUNTA**: `=COUNT(W1:W10)`, `=COUNTA(X1:X10)` - Counts the number of cells with numbers and non-blank cells.
- **MEDIAN**: `=MEDIAN(Y1:Y10)` - Finds the median of a group of numbers.
- **MODE**: `=MODE(Z1:Z10)` - Returns the most frequently occurring number in a data set.
- **STDEV.P/STDEV.S**: `=STDEV.P(AA1:AA10)` - Calculates the standard deviation for an entire population or a sample.
- **VAR.P/VAR.S**: `=VAR.P(AB1:AB10)` - Calculates the variance for an entire population or a sample.

9. Data Analysis Tools

- **PivotTables**: `Insert` → `PivotTable` - Summarizes large amounts of data quickly and flexibly.
- **Data Tables**: `Data` → `What-If Analysis` → `Data Table` - Performs multiple calculations on your data.
- **Solver**: `Data` → `Solver` - Finds an optimal value for a formula in one cell.
- **Goal Seek**: `Data` → `What-If Analysis` → `Goal Seek` - Adjusts a value to achieve a desired goal.
- **Scenario Manager**: `Data` → `What-If Analysis` → `Scenario Manager` - Creates and saves different groups of values on a worksheet.

10. Charts and Graphs

- **Creating a Chart**: `Insert` → `Recommended Charts` → `Select Chart Type`.
- **Creating a PivotChart**: `Insert` → `PivotChart`.
- **Formatting Charts**: Use `Chart Tools` for layout and design adjustments.
- **Creating Sparklines**: `Insert` → `Sparklines` → `Select Type`.
- **Conditional Formatting in Charts**: Use the `Format Data Series` options.

11. Conditional Formatting

- **Applying Conditional Formatting:** Home → Conditional Formatting.
- **Data Bars/Color Scales/Icon Sets:** Home → Conditional Formatting → Choose a style.
- **Creating Custom Rules:** Home → Conditional Formatting → New Rule.
- **Highlighting Cell Rules:** Home → Conditional Formatting → Highlight Cells Rules.
- **Managing Rules:** Home → Conditional Formatting → Manage Rules.

12. Data Validation

- **Creating Drop-Down Lists:** Data → Data Validation → Allow: List.
- **Setting Number, Date, or Time Ranges:** Data → Data Validation → Allow: Date, Time, or Decimal.
- **Custom Validation Based on a Formula:** Data → Data Validation → Allow: Custom.
- **Creating Input Messages and Error Alerts:** Data → Data Validation → Input Message/Error Alert.

13. Advanced Excel Features

- **Using Power Query (Get & Transform):** Data → Get Data → Combine Queries.
- **Utilizing Power Pivot:** Manage with the Power Pivot add-in.
- **Using Macro Recorder:** View → Macros → Record Macro.
- **Writing VBA Code:** View → Macros → View Macros → Edit.
- **Using Form Controls:** Developer → Insert → Form Controls.

14. Excel Tables

- **Creating a Table:** Insert → Table or Ctrl + T.
- **Table Slicers for Easy Filtering:** Insert → Slicer.
- **Referencing Table Elements in Formulas:** Use structured references like Table1[Column1].
- **Total Row for Quick Calculations:** Table Tools → Design → Total Row.

- **Resizing and Formatting Tables:** Table Tools → Design → Resize Table.

15. Advanced Formulas

- **Array Formulas:** Entered with Ctrl + Shift + Enter.
- **Dynamic Arrays (for newer Excel versions):** =SORT(), =FILTER(), =UNIQUE().
- **Using INDIRECT for Dynamic References:** =INDIRECT("A" & 1).
- **Combining IF with AND, OR:** =IF(AND(condition1, condition2), value_if_true, value_if_false).
- **Nested IF Statements:** =IF(condition1, value_if_true1, IF(condition2, value_if_true2, value_if_false2)).

16. Text and Data Extraction

- **LEFT, RIGHT, MID for Text Extraction:** =LEFT(text, num_chars).
- **SEARCH, FIND for Position of Substring:** =SEARCH("substr", text).
- **TEXTJOIN, CONCAT for Joining Text:** =TEXTJOIN(delimiter, ignore_empty, text1, [text2], ...).
- **TRIM for Removing Extra Spaces:** =TRIM(text).
- **VALUE for Converting Text to Number:** =VALUE(text).
- **SPLIT Text into Columns:** Data → Text to Columns.
- **SUBSTITUTE to Replace Text:** =SUBSTITUTE(text, old_text, new_text).
- **LEN to Get Length of Text:** =LEN(text).

17. Data Import and Connection

- **Import Data from External Sources:** Data → Get Data.
- **Connecting to SQL Databases:** Data → Get Data → From Database.
- **Importing Data from Web:** Data → Get Data → From Web.
- **Refreshing Imported Data:** Data → Refresh All.

18. Working with Large Data

- **Freeze Panes for Easy Navigation:** View → Freeze Panes.
- **Splitting Window:** View → Split.

- **Using Named Ranges for Easy Reference:** Formulas → Name Manager → New Name.
- **Data Consolidation:** Data → Consolidate.
- **Grouping and Ungrouping Data:** Data → Group.

19. Formulas and Features for Business Analysis

- **NPV and IRR for Financial Analysis:** =NPV(rate, value1, [value2], ...), =IRR(values).
- **PMT for Loan Payments:** =PMT(rate, nper, pv).
- **XNPV and XIRR for Non-Periodic Cash Flows:** =XNPV(rate, values, dates), =XIRR(values, dates).
- **Using Data Tables for Scenario Analysis:** Data → What-If Analysis → Data Table.
- **Break-Even Analysis Formulas:** Custom formulas based on fixed and variable costs.

20. Excel Add-ins for Enhanced Capabilities

- **Using Solver Add-in for Optimization Problems:** Data → Solver.
- **Analysis ToolPak for Statistical Analysis:** Add-ins → Analysis ToolPak.
- **Power Map for Geospatial Analysis:** Insert → 3D Map.
- **Using Power Query for Advanced Data Transformation:** Data → Get & Transform Data.
- **Inquire Add-in for Workbook Analysis and Comparison:** Add-ins → Inquire → Workbook Analysis.

21. Advanced Data Manipulation

- **Flash Fill for Pattern Recognition:** Data → Flash Fill.
- **Using Advanced Filter for Complex Criteria:** Data → Advanced.
- **Remove Duplicates to Clean Data:** Data → Remove Duplicates.
- **Text to Columns for Delimited Data:** Data → Text to Columns.

22. Custom Formatting

- **Custom Number Formats:** Home → Number → More Number Formats.
- **Conditional Custom Number Formats:** Using custom formats with conditions in the Format Cells dialog.
- **Creating Custom Date Formats:** Customizing date display in Format Cells dialog.
- **Using Color in Custom Formats:** Incorporating font color changes in custom formats.

23. Advanced Formulas and Functions

- **Nested Functions for Complex Calculations:** Combining multiple functions like `IF`, `VLOOKUP`, and `MATCH`.
- **Using INDIRECT for Dynamic Cell Reference:** `=INDIRECT(ref_text)`.
- **OFFSET for Dynamic Range Selection:** `=OFFSET(reference, rows, cols, [height], [width])`.
- **SUMPRODUCT for Multi-Condition Summing:**
`=SUMPRODUCT((range1=criteria1)*(range2=criteria2)*sum_range)`.

24. Data Validation and Error Checking

- **Using Data Validation for Controlled Inputs:** Data → Data Validation.
- **Circle Invalid Data:** Data Validation → Circle Invalid Data.
- **Error Checking and Tracing:** Formulas → Error Checking.
- **Tracing Precedents and Dependents:** Formulas → Trace Precedents/Trace Dependents.

25. Using Forms and Controls

- **Creating Forms for Data Entry:** Developer → Insert → Form Controls.
- **Using Spin Button for Incremental Change:** Inserting a spin button and linking it to a cell.
- **Check Boxes for Binary Choices:** Using check boxes for Yes/No selections.

- **Option Buttons for Multiple Choice:** Grouping option buttons for single-choice selection.

26. PivotTable Advanced Techniques

- **Calculated Fields in PivotTables:** Analyze → Fields, Items, & Sets → Calculated Field.
- **Grouping Data in PivotTables:** Right-click on a field item → Group.
- **PivotTable Slicers for Interactive Filtering:** Analyze → Insert Slicer.
- **PivotTable Timelines for Date Filtering:** Analyze → Insert Timeline.

27. Advanced Charting Techniques

- **Combination Charts for Mixed Data Types:** Creating charts with multiple axis types.
- **Secondary Axis for Comparison:** Format Data Series → Plot Series On → Secondary Axis.
- **Dynamic Charts with OFFSET and Named Ranges:** Using named formulas to create dynamic charts.
- **Creating Waterfall Charts for Financial Analysis:** Insert → Waterfall Chart.

28. Macros and VBA for Automation

- **Recording Macros for Repetitive Tasks:** View → Macros → Record Macro.
- **Editing Macros in VBA Editor:** View → Macros → View Macros → Edit.
- **Writing Custom VBA Functions:** Implementing user-defined functions in VBA.
- **Automating Data Analysis with VBA:** Writing scripts to automate complex data analysis tasks.

29. Advanced Statistical Analysis

- **ANOVA with Analysis ToolPak:** Data Analysis → ANOVA.

- **Regression Analysis:** Data Analysis → Regression.
- **Correlation Analysis:** Data Analysis → Correlation.
- **Descriptive Statistics:** Data Analysis → Descriptive Statistics.

30. Power Tools for Data Analysis

- **Introduction to Power Query for Data Transformation:** Data → Get & Transform Data.
- **Using Power Pivot for Data Modeling:** Managing Data Model in Power Pivot.
- **DAX (Data Analysis Expressions) in Power Pivot:** Writing DAX formulas for advanced calculations.
- **Creating Interactive Dashboards with Power BI:** Using Power BI integration for dynamic reporting.

31. Excel Connectivity

- **Connecting to External Databases:** Data → Get Data → From Database.
- **Using ODBC for Data Import:** Data → Get Data → From Other Sources → From ODBC.
- **Linking Excel with Other Office Applications:** Embedding and linking objects with Word, PowerPoint.
- **Web Queries to Import Data from the Web:** Data → Get Data → From Web.

32. Excel Options and Customization

- **Customizing the Ribbon:** Right-click the Ribbon → Customize the Ribbon.
- **Changing Excel Options and Defaults:** File → Options.
- **Setting Excel Add-ins:** File → Options → Add-ins.
- **Creating Custom Templates for Reuse:** Saving a workbook as an Excel Template (.xltx).

33. Excel Tips for Large Data Sets

- **Optimizing Performance for Large Workbooks:** Best practices like avoiding volatile functions, minimizing used range.
- **Breaking Down Large Workbooks:** Splitting data into multiple sheets or files to improve performance.