EXCEL NOTES

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1

Spreadsheets:

1. Software that stores the data in Table format – in rows and Columns
2. Spreadsheet is typically used for:

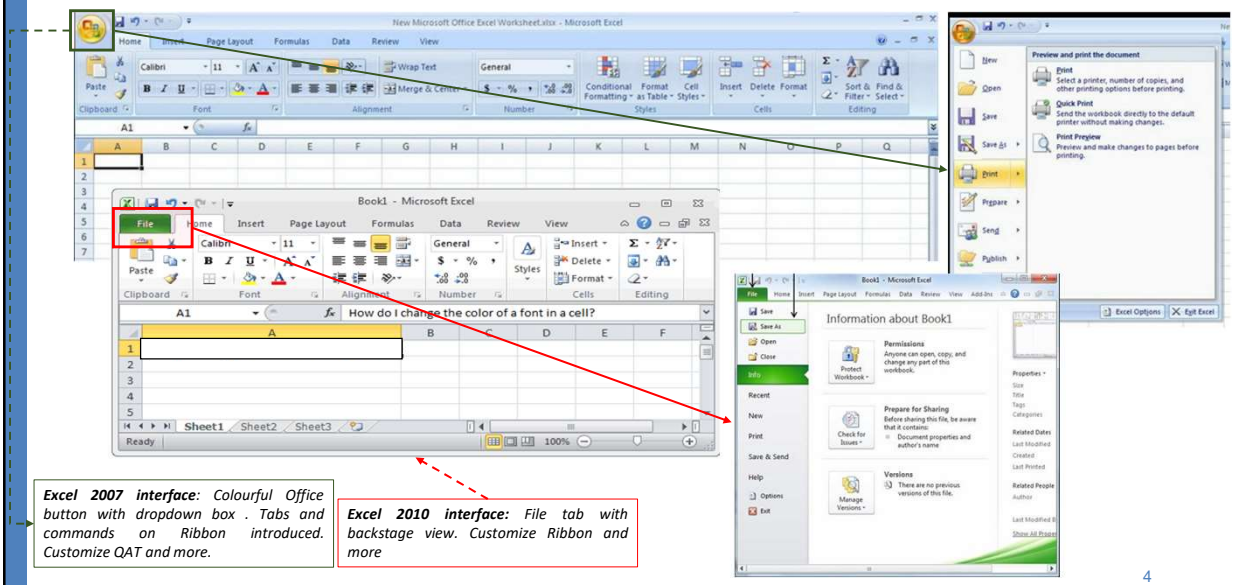
- **Data Analysis**
- **Visuals and graphs**
- Programming (Automation)
- Data entry & Data management
- Accounting & Budgeting
- **Modeling**
- Planning
- Flow Chart for Biz Process

2

Excel

- It is a spreadsheet program developed by Microsoft.
- Excel organizes data in columns and rows and allows you to do mathematical functions.
- Web based version – Excel for web
- It runs on Windows, macOS, Android and iOS.
- The first version was released in 1985

3

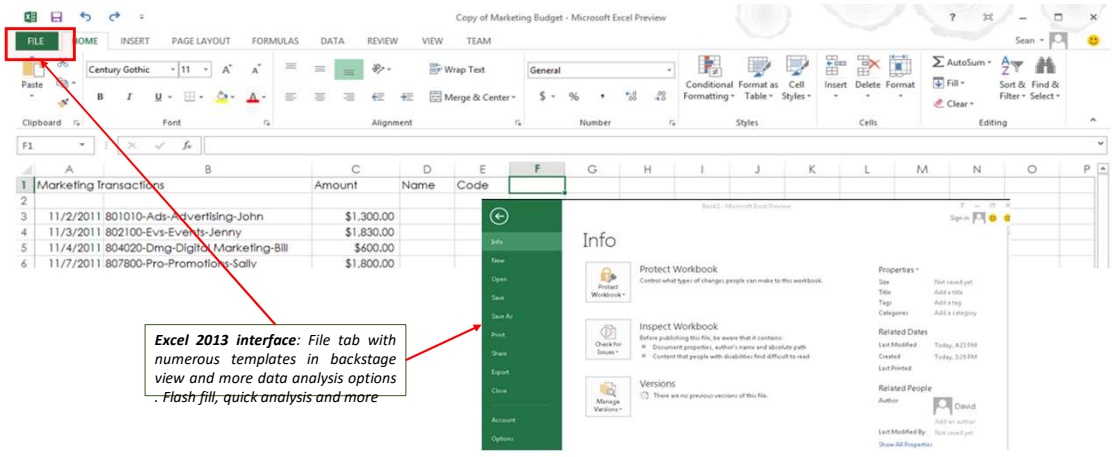


Excel 2007 interface: *Colourful Office button with dropdown box . Tabs and commands on Ribbon introduced. Customize QAT and more.*

Excel 2010 interface: *File tab with backstage view. Customize Ribbon and more*

4

Versions & Interface



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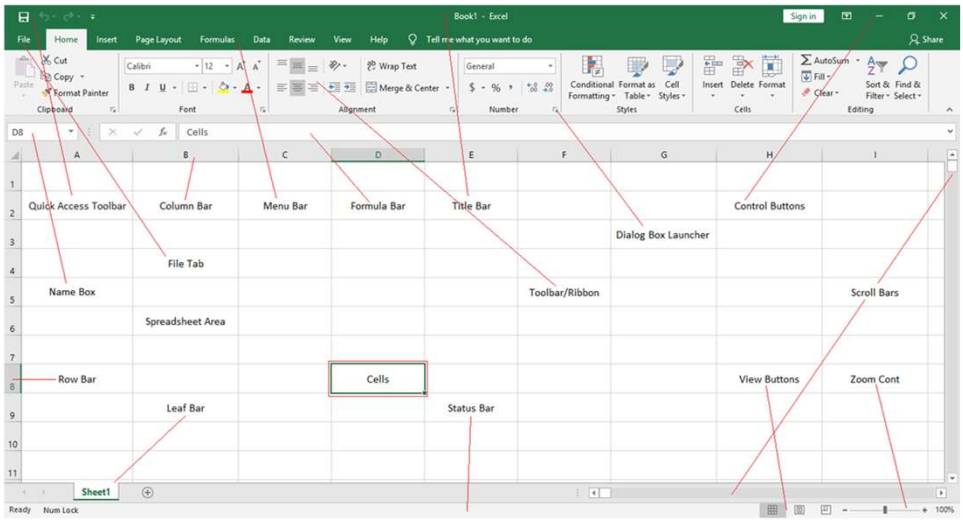
Versions & Interface



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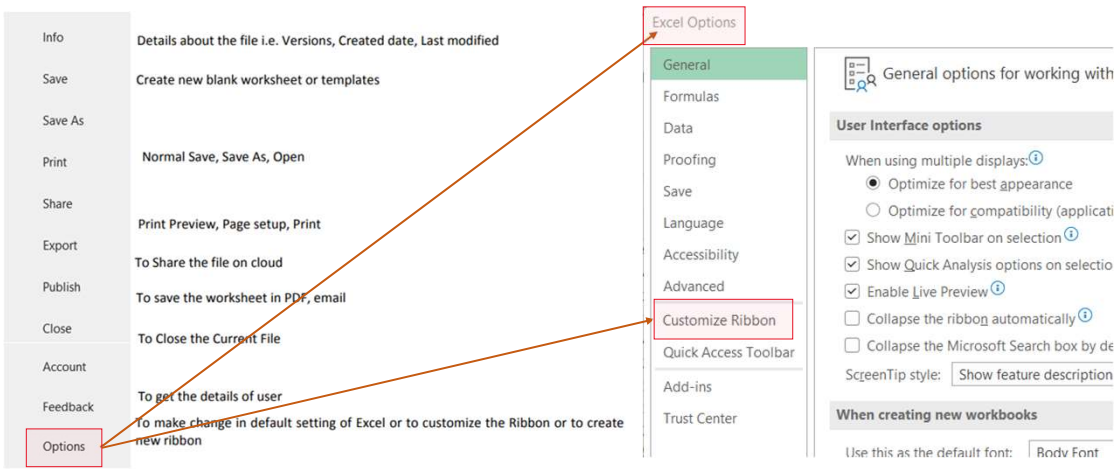
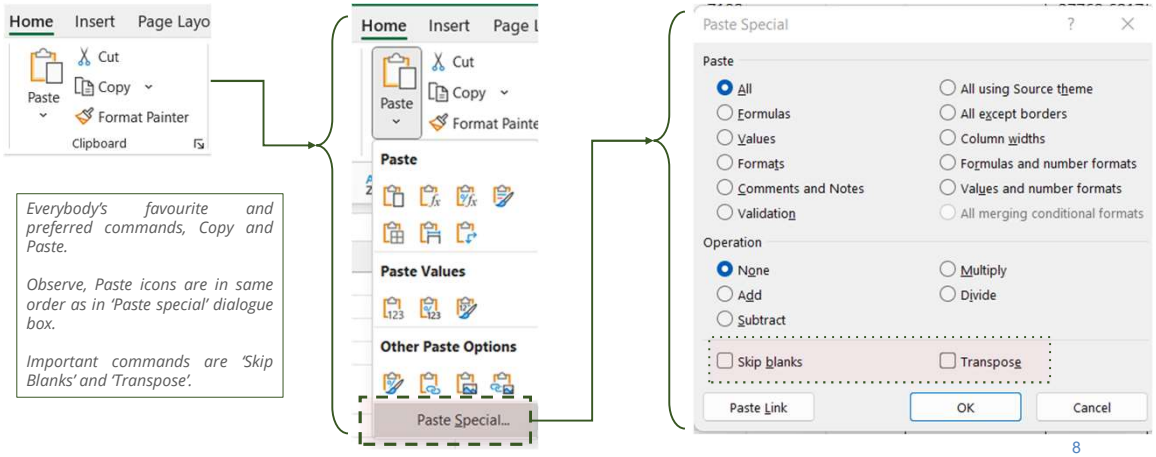
Versions & Interface



7

Paste and Paste Special



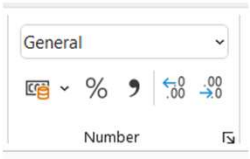
Everybody's favourite and preferred commands, Copy and Paste.

Observe, Paste icons are in same order as in 'Paste special' dialogue box.

Important commands are 'Skip Blanks' and 'Transpose'.

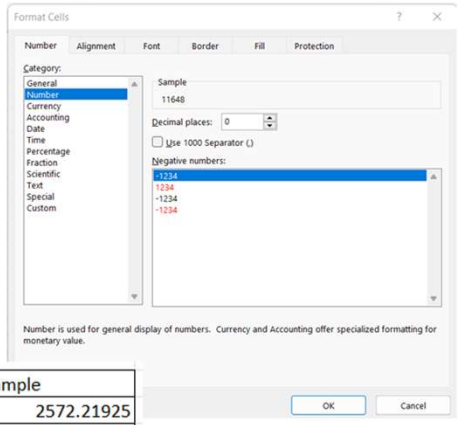
8

Formatting & Proofing



ETL step 1 is correct Formatting to respective Variables in the dataset.

Number Format commands are present in 'Home' tab.



Month	Units	AUM
2016 / 01	11648.12667	200464.26
2016 / 01	365.8366667	2520.614667
2016 / 01	1401.203333	30672.341
2016 / 01	18.9685	1790.766667
2016 / 01	30.8355	2794.216667
2016 / 01	71.43833333	7108.466667
2016 / 01	74.10666667	2422.547
2016 / 01	1221.620833	18446.47458
2016 / 01	108.1766667	1114.219667

Month	Units	AUM
Jan-16	11648	200464
Jan-16	366	2521
Jan-16	1401	30672
Jan-16	19	1791
Feb-16	31	2794
Feb-16	71	7108
Feb-16	74	2423

Keyboard shortcut	Action	Example
CTRL+SHIFT+ ~	General	2572.21925
CTRL+SHIFT+1	Number	2,572.22
CTRL+SHIFT+2	Time	05:15
CTRL+SHIFT+3	Date	15-Jan-07
CTRL+SHIFT+4	Currency	₹ 2,572.22
CTRL+SHIFT+5	Percentage	257222%

9

Functions in Excel

Text Functions are used to manipulate and format text strings.
Here are some key text functions:

1. CONCATENATE / CONCAT: Combines multiple text strings into one.
2. LEFT: Extracts a specified number of characters from the start of a text string.
3. RIGHT: Extracts a specified number of characters from the end of a text string.
4. MID: Extracts characters from the middle of a text string.
5. LEN: Returns the length of a text string.
6. TRIM: Removes extra spaces from a text string.
7. UPPER: Converts text to uppercase.
8. LOWER: Converts text to lowercase.
9. PROPER: Capitalizes the first letter of each word in a text string.
10. SUBSTITUTE: Replaces occurrences of a specified text string with another text string.
11. REPLACE: Replaces part of a text string with another text string.
12. CLEAN: Removes all non-printable characters from a text string.

10

Functions in Excel

Number Functions are used to perform calculations and manipulate numeric data. Here are some key number functions:

1. SUM: Adds up a range of numbers.
2. AVERAGE: Calculates the average of a range of numbers.
3. COUNT: Counts the number of cells that contain numbers.
4. COUNTA: Counts the number of non-blank cells.
5. MAX: Returns the maximum value in a range.
6. MIN: Returns the minimum value in a range.
7. ROUND: Rounds a number to a specified number of digits.
8. ROUNDUP: Rounds a number up to a specified number of digits.
9. ROUNDDOWN: Rounds a number down to a specified number of digits.
10. POWER: Raises a number to the power of another number.
11. ABS: Returns the absolute value of a number.
12. SQRT: Returns the square root of a number.

11

Functions in Excel

Date functions are used to manipulate and calculate dates.
Here are some key date functions:

1. TODAY: Returns the current date.
2. NOW: Returns the current date and time.
3. YEAR/MONTH/DAY: Extracts parts of the Date
4. HOUR/MINUTE/SECOND: Extracts parts of the Time
5. DATE: Creates a date from individual year, month, and day components.
6. TIME: Creates a time from individual hour, minute and second components
7. DATEDIF: Calculates the difference between two dates.
8. EDATE: Returns the date that is a specified number of months before or after a given date.
9. EOMONTH: Returns the last day of the month that is a specified number of months before or after a given date.
10. TEXT: Converts a date to text in a specified format.

12

Functions in Excel

Aggregate functions in Excel are used to perform calculations on a range of data, such as summing, averaging, or finding the maximum or minimum value. These functions are essential for data analysis and can handle various operations while optionally ignoring hidden rows and error values. Here are some key aggregate functions:

1. AVERAGE: Calculates the mean of the values in the specified range.
2. COUNT: Counts the number of non-blank cells in the specified range.
3. COUNTA: Counts the number of cells that are not empty in the specified range.
4. MAX: Finds the maximum value in the specified range.
5. MIN: Finds the minimum value in the specified range.
6. SUM: Adds up all the numbers in the specified range.
7. MEDIAN: Returns the median (middle value) of the numbers.
8. LARGE: Returns the k-th largest value in a data set.
9. SMALL: Returns the k-th smallest value in a data set.

13

Functions in Excel

Logical functions in Excel are used to perform logical tests and return values based on the results of those tests. These functions are essential for decision-making processes in data analysis. Here are some key logical functions:

1. IF: Performs a logical test and returns one value for a TRUE result and another for a FALSE result.
2. AND: Returns TRUE if all its arguments are TRUE.
3. OR: Returns TRUE if any of its arguments are TRUE.
4. NOT: Reverses the logic of its argument, returning FALSE if the argument is TRUE and TRUE if the argument is FALSE.
5. IFERROR: Returns a value you specify if a formula evaluates to an error; otherwise, it returns the result of the formula.
6. IFS: Checks whether one or more conditions are met and returns a value that corresponds to the first TRUE condition.
7. Nested IF: A formula where one IF function is placed inside another IF function to test multiple conditions sequentially. This allows for more complex decision-making processes within a single formula.

14

Functions in Excel

Conditional aggregate functions in Excel allow you to perform aggregate calculations (like SUM, AVERAGE, COUNT, etc.) based on specific conditions or criteria. Here are some key functions and methods to achieve this:

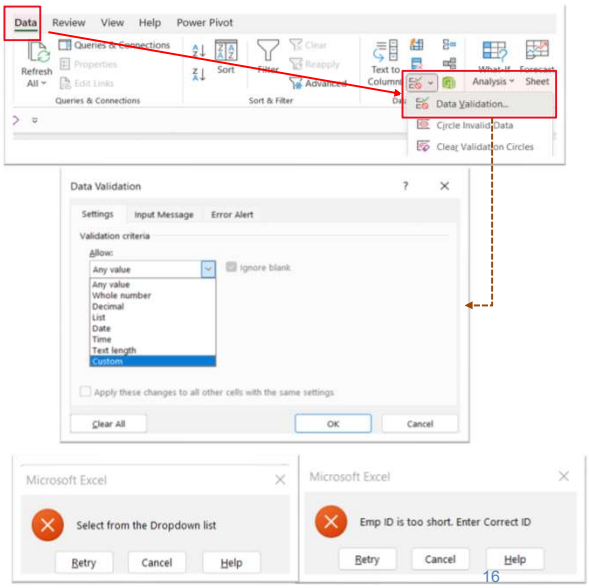
1. SUMIF: Adds the values in a range that meet a single criterion.
2. SUMIFS: Adds the values in a range that meet multiple criteria.
3. COUNTIF: Counts the number of cells in a range that meet a single criterion.
4. COUNTIFS: Counts the number of cells in a range that meet multiple criteria.
5. AVERAGEIF: Calculates the average of the values in a range that meet a single criterion.
6. AVERAGEIFS: Calculates the average of the values in a range that meet multiple criteria.
7. MINIFS: Returns the minimum value in a range that meets multiple criteria.
8. MAXIFS: Returns the maximum value in a range that meets multiple criteria.

15

Data validation

- Data Validation is a process which restricts the users from entering invalid data for individual cells or cell ranges.
- Suppose you do not want the user to enter a non text value in a cell or you want to restrict data entry to certain values. You may use Data Validation for these.
- It limits the data entry to a particular type, such as whole numbers, decimal numbers or text and sets limit on valid entries.
- Error pop-up box indicates correct value to be entered.

Note:- If you do not enter a title or text, the title defaults to "Microsoft Excel" and the message to "The value you entered is not valid. A user has restricted values that can be entered into this cell."



16

Common types of Data Validation application

- Data Type Check: Ensures that the data entered matches the expected data type, such as numeric, text.
- Range Check: Verifies that the data falls within a specified range. For example, a temperature value should be between -50°C and 50°C2.
- Consistency Check: Ensures that data entries are logically consistent. For example, the end date of a project should not be before the start date.
- Uniqueness Check: Ensures that each data entry is unique, such as unique email addresses or IDs.
- Code Check: Validates that the data matches a predefined list of acceptable values, like country codes or product categories

17

Conditional Formatting

Conditional Formatting in Excel allows you to automatically apply formatting—such as colors, icons, and data bars—to cells based on the values they contain. This helps to highlight important information, identify trends, and make your data easier to understand.

Key Features:

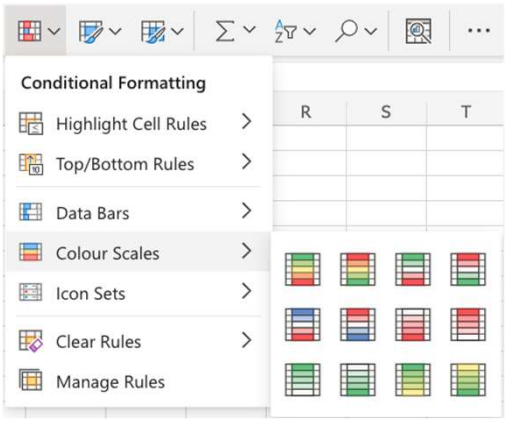
1. Highlight Cells Rules: Format cells that meet specific criteria, such as being greater than, less than, between, equal to a certain value, or containing specific text or dates.
2. Top/Bottom Rules: Highlight the top or bottom values, such as the top 10 items, top 10%, bottom 10 items, or bottom 10%.
3. Data Bars: Add horizontal bars to cells to visually represent the value in each cell relative to the others.
4. Color Scales: Apply a gradient of colors to a range of cells, where the color intensity represents the value.
5. Icon Sets: Add icons to cells based on their values, such as arrows, flags, or traffic lights.
6. Custom Rules: Use formulas to create custom conditional formatting rules that evaluate to TRUE or FALSE.

18

Conditional Formatting

How to Apply Conditional Formatting:

1. Select the Range: Highlight the cells you want to format.
2. Open Conditional Formatting: Go to the Home tab, click on Conditional Formatting in the Styles group.
3. Choose a Rule Type: Select from the built-in rules or create a new rule.
4. Set the Criteria: Define the conditions that trigger the formatting.
5. Choose the Format: Specify the formatting to apply when the conditions are met.
6. Apply the Rule: Click OK to apply the formatting.



19

Sorting Data

Sorting arranges your data in a specific order, either ascending or descending. This is useful for organizing data alphabetically, numerically, or by date.

How to Sort Data:

1. Select the Column: Click any cell in the column you want to sort.
2. Sort Options: Go to the Data tab and choose Sort Ascending (A to Z or smallest to largest) or Sort Descending (Z to A or largest to smallest).

Custom Sorting:

1. Multiple Levels: You can sort by multiple columns. Go to Data > Sort > Add Level to specify additional columns and sort orders.
2. Custom Lists: Create custom sort orders, such as sorting by days of the week or months of the year.

20

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21

Filtering Data

Filtering allows you to display only the rows that meet certain criteria, hiding the rest. This is useful for focusing on specific subsets of your data.

Types of Filters:

1. Text Filters: Filter by specific text, contains, begins with, ends with, etc.
2. Number Filters: Filter by specific numbers, greater than, less than, between, etc.
3. Date Filters: Filter by specific dates, before, after, between, etc.

How to Apply a Filter:

1. Select the Range: Click any cell within the range you want to filter.
2. Add Filter: Go to the Data tab and click on Filter in the Sort & Filter group. This adds drop-down arrows to each column header.
3. Set Filter Criteria: Click the drop-down arrow in the column header and select the criteria you want to filter by. You can filter by text, number, date, or custom criteria.

22

Filtering Data

Filtering allows you to display only the rows that meet certain criteria, hiding the rest.
This is useful for focusing on specific subsets of your data.

The **Advanced Filter** in Excel is a powerful tool that allows you to filter data based on complex criteria and extract the filtered data to a new location if needed. This feature is particularly useful when you need to apply multiple criteria or use logical formulas to filter your data.

Key Features:

- Complex Criteria: Allows you to use multiple criteria and logical operators (AND, OR) to filter data.
- Extract Data: You can filter data in place or copy the filtered data to another location.
- Unique Records: Extract unique records from your data set, which is useful for removing duplicates.
- Wildcard Characters: Use wildcard characters like * (any number of characters) and ? (single character) in your criteria.

23

Searching with Lookup Functions in Excel

Lookup functions in Excel are powerful tools for searching and retrieving data from a specific table or range based on certain conditions or criteria. Here are some key lookup functions along with their key features:

1. **LOOKUP**
2. **VLOOKUP**
3. **HLOOKUP**
4. **XLOOKUP**
5. **INDEX& MATCH**

24

Searching with Lookup Functions in Excel

LOOKUP: Searches for a value in a one-row or one-column range and returns a value from the same position in another one-row or one-column range.

Key Features:
1. Simple lookup for single rows or columns.
2. Useful for backward compatibility with older Excel versions.
3. Lookup Column must be sorted.
4. Can Search from Left to Right as well as Right to Left.

XLOOKUP: Searches a range or array and returns an item corresponding to the first match it finds. It can search in any direction (up, down, left, right).

Key Features:
1. Flexible lookup direction (vertical and horizontal).
2. Returns exact matches by default.
3. Can handle missing values and return custom messages.
4. Supports array formulas for dynamic ranges.
5. Can search from the bottom up or right to left.

25

Searching with Lookup Functions in Excel

VLOOKUP: Searches for a value in the first column of a range and returns a value in the same row from a specified column.

Key Features:
1. Vertical lookup.
2. Requires the lookup value to be in the first column.
3. Can return approximate or exact matches.
4. Supports wildcard characters for partial matches.
5. Can be combined with other functions for more complex lookups.

HLOOKUP: Searches for a value in the first row of a range and returns a value in the same column from a specified row.

Key Features:
1. Horizontal lookup.
2. Requires the lookup value to be in the first row.
3. Can return approximate or exact matches.
4. Supports wildcard characters for partial matches.
5. Useful for transposed data tables.

26

Searching with Lookup Functions in Excel

INDEX: Returns the value of a cell in a specified row and column within a range.

Key Features:
1. Can return values from any position in a range.
2. Often used with MATCH for flexible lookups.
3. Can be used to return entire rows or columns.

MATCH: Searches for a specified value in a range and returns the relative position of that value within the range.

Key Features:
1. Returns the position of a value in a range.
2. Can be combined with INDEX for complex lookups.
3. Supports exact, approximate, and wildcard matches.
4. Useful for dynamic range lookups.

27

Searching with Lookup Functions in Excel

Using CHOOSE with VLOOKUP
The CHOOSE function can be used with VLOOKUP to create a virtual table that allows you to look up data from non-adjacent columns or rearrange columns for the lookup.

Key Features:
1. Flexibility: Allows you to create a virtual table with columns in any order.
2. Multiple Conditions: Can handle multiple conditions by concatenating columns.

Using OFFSET with VLOOKUP
The OFFSET function can be used with VLOOKUP to dynamically adjust the range of data being looked up. This is useful when the lookup range needs to change based on certain conditions.

Key Features:
1. Dynamic Ranges: Adjusts the lookup range dynamically based on specified criteria.
2. Relative Positioning: Returns a range that is a specified number of rows and columns from a starting cell.

28

Pivot Tables in Excel

Pivot Tables are one of Excel's most powerful features, allowing you to summarize, analyze, explore, and present your data. They enable you to extract significant insights from large datasets by organizing and rearranging data dynamically.

Key Features:

1. Data Summarization: Quickly summarize large amounts of data by categories and subcategories.
2. Dynamic Data Analysis: Rearrange (pivot) data to view it from different perspectives.
3. Automatic Grouping: Automatically group data by dates, numbers, or other categories.
4. Filtering and Sorting: Easily filter and sort data to focus on specific information.
5. Calculated Fields and Items: Create custom calculations within the pivot table.
6. Pivot Charts: Visualize pivot table data with dynamic charts.
7. Drill Down: Double-click on summarized data to see the underlying details.

29

Pivot Tables in Excel

Advanced Features:

1. Calculated Fields:
   - Create custom calculations within your pivot table.
   - Go to the PivotTable Analyze tab, click on Fields, Items & Sets, and select Calculated Field.
2. Grouping Data:
   - Group data by dates, numbers, or other categories.
   - Right-click on a field in the pivot table and select Group.
3. Pivot Charts:
   - Create dynamic charts based on your pivot table data.
   - Go to the Insert tab and select PivotChart.
4. Slicers and Timelines:
   - Add slicers and timelines for interactive filtering.
   - Go to the PivotTable Analyze tab and click on Insert Slicer or Insert Timeline.

30

Pivot Tables in Excel

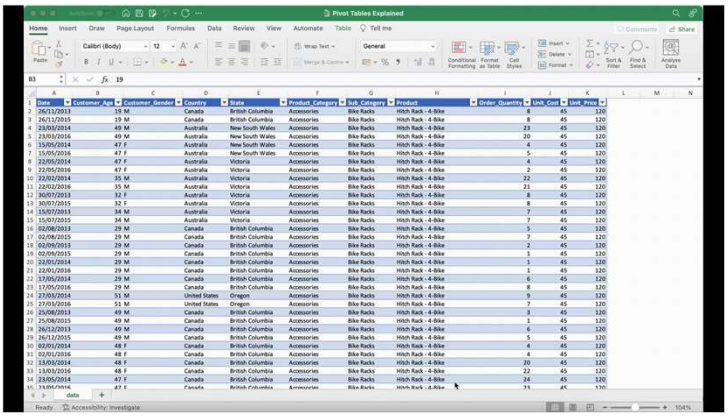
How to Create a Pivot Table:

1. Select Your Data:
   - Click any cell within the range of data you want to analyze.
   - Ensure your data has column headers and no blank rows.
2. Insert a Pivot Table:
   - Go to the Insert tab.
   - Click on PivotTable in the Tables group.
   - In the dialog box, confirm the data range and choose whether to place the pivot table in a new worksheet or an existing one.
   - Click OK.

31

Pivot Tables in Excel

How to Create a Pivot Table:



32

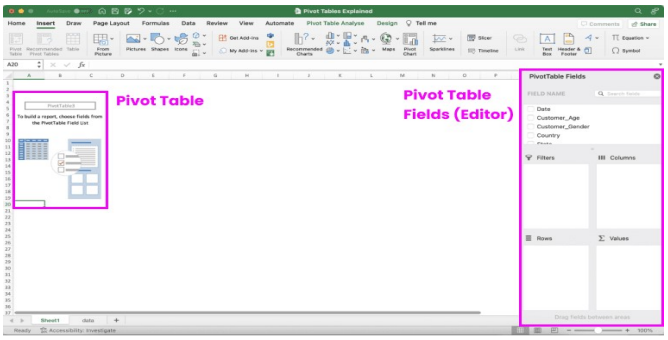
Pivot Tables in Excel

How to Create a Pivot Table:

3. Build Your Pivot Table:

The PivotTable Fields pane will appear.

Drag fields to the Rows, Columns, Values, and Filters areas to organize your data.



33

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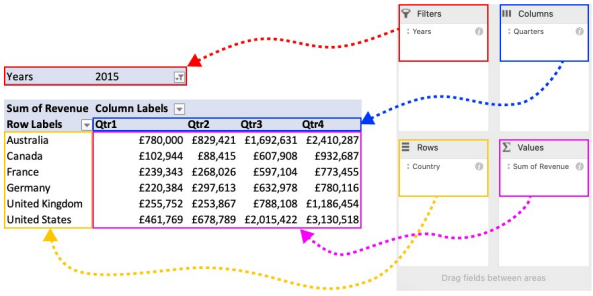

Sum of Revenue	Column Labels			
Row Labels	Qtr1	Qtr2	Qtr3	Qtr4
Australia	£780,000	£829,421	£1,692,631	£2,410,287
Canada	£102,944	£88,415	£607,908	£932,687
France	£239,343	£268,026	£597,104	£773,455
Germany	£220,384	£297,613	£632,978	£780,116
United Kingdom	£255,752	£253,867	£788,108	£1,186,454
United States	£461,769	£678,789	£2,015,422	£3,130,518

34

Data Modeling in Excel

Data modeling in Excel involves organizing and analyzing data from multiple sources. This process, known as the Data Model, lets you connect different tables, perform complex calculations, and create detailed reports and dashboards.

What is a Data Model?
A **data model** in Excel allows you to integrate data from multiple tables, effectively creating a relational database within your workbook. This enables you to perform more complex analyses and create more insightful reports.

35

Data Modeling in Excel

Data modeling in Excel involves organizing and analyzing data from multiple sources. This process, known as the Data Model, lets you connect different tables, perform complex calculations, and create detailed reports and dashboards.

What is a Relationship?
A **relationship** is a connection between two tables that allows you to pull data from both tables into a single report or analysis.

Why Use Relationships?
- Avoid Data Duplication: Store data in separate tables and link them, rather than duplicating data across multiple tables.
- Simplify Data Management: Manage and update data in one place, and it will reflect across all related tables.
- Enhanced Analysis: Create more complex and insightful reports by combining data from different tables.

36

Data Modeling in Excel

Data modeling in Excel involves organizing and analyzing data from multiple sources. This process, known as the Data Model, lets you connect different tables, perform complex calculations, and create detailed reports and dashboards.

What is Power Pivot?

Power Pivot is an Excel add-in that allows you to:

- Import Data: Use the Power Pivot tab to import data from various sources.
- Create Relationships: Link tables in your data model to establish relationships.
- Add Calculated Columns: Use DAX to perform custom calculations.
- Create PivotTables and Charts: Visualize your data with PivotTables and charts.

37