Table of Contents

[Excel Essentials 4](#_Toc163136365)

[Text to Columns 4](#_Toc163136366)

[Objective 4](#_Toc163136367)

[Steps 4](#_Toc163136368)

[Cell Formatting 5](#_Toc163136369)

[Objective 5](#_Toc163136370)

[Overview 5](#_Toc163136371)

[Detailed Steps 5](#_Toc163136372)

[Autofill and Flash Fill 6](#_Toc163136373)

[Objective 6](#_Toc163136374)

[Auto Fill 6](#_Toc163136375)

[Flash Fill 6](#_Toc163136376)

[Data Validation and Named Ranges 7](#_Toc163136377)

[Objective 7](#_Toc163136378)

[Named Range 7](#_Toc163136379)

[Data Validation 7](#_Toc163136380)

[Cell References 8](#_Toc163136381)

[Objective 8](#_Toc163136382)

[Understanding Cell References 8](#_Toc163136383)

[Locking Cell References 8](#_Toc163136384)

[Using the F4 Key 8](#_Toc163136385)

[Excel Tables 9](#_Toc163136386)

[Objective 9](#_Toc163136387)

[Creating a Table 9](#_Toc163136388)

[Formatting and Naming the Table 9](#_Toc163136389)

[Expanding the Table 9](#_Toc163136390)

[Using Formulas with Tables 9](#_Toc163136391)

[Text Functions 10](#_Toc163136392)

[An Overview 10](#_Toc163136393)

[Basic Text Functions 11](#_Toc163136394)

[Concatenate 11](#_Toc163136395)

[Trim 11](#_Toc163136396)

[Len 11](#_Toc163136397)

[Proper, Lower, and Upper 11](#_Toc163136398)

[LEFT and RIGHT 12](#_Toc163136399)

[Objective 12](#_Toc163136400)

[LEFT Function 12](#_Toc163136401)

[RIGHT Function 12](#_Toc163136402)

[Application Scenarios 12](#_Toc163136403)

[MID 13](#_Toc163136404)

[Objective 13](#_Toc163136405)

[Steps 13](#_Toc163136406)

[Application Tips 13](#_Toc163136407)

[FIND 14](#_Toc163136408)

[Objective 14](#_Toc163136409)

[Steps 14](#_Toc163136410)

[Objective 15](#_Toc163136411)

[Steps 15](#_Toc163136412)

[Substitute 16](#_Toc163136413)

[VALUE 17](#_Toc163136414)

[Application Tip 17](#_Toc163136415)

[Logical and Conditional Aggregates 18](#_Toc163136416)

[IF 18](#_Toc163136417)

[Application Tip 18](#_Toc163136418)

[AND/OR 19](#_Toc163136419)

[Application Tip 19](#_Toc163136420)

[IFERROR 20](#_Toc163136421)

[Application Tip 20](#_Toc163136422)

[SUMIF 21](#_Toc163136423)

[Objective 21](#_Toc163136424)

[Steps 21](#_Toc163136425)

[Application Tip 21](#_Toc163136426)

[SUMIFS 22](#_Toc163136427)

[Application Tip 22](#_Toc163136428)

[Date and Time Functions 23](#_Toc163136429)

[DATEVALUE 23](#_Toc163136430)

[Application Tip 23](#_Toc163136431)

[EDATE AND EOMONTH 24](#_Toc163136432)

[Application Tip 24](#_Toc163136433)

[DATEDIF 25](#_Toc163136434)

[Application Tip 25](#_Toc163136435)

[WORKDAY 26](#_Toc163136436)

[Application Tip 26](#_Toc163136437)

[NETWORKDAYS 27](#_Toc163136438)

[Application Tip 27](#_Toc163136439)

[Look Up Functions 28](#_Toc163136440)

[VLOOKUP 28](#_Toc163136441)

[Objective 28](#_Toc163136442)

[Application Tip 28](#_Toc163136443)

[Basic Charts 29](#_Toc163136444)

[Pie Chart 29](#_Toc163136445)

[Steps 29](#_Toc163136446)

[Bar Chart 29](#_Toc163136447)

[Steps 29](#_Toc163136448)

[Line Chart 29](#_Toc163136449)

[Steps 29](#_Toc163136450)

[Customization Tips 30](#_Toc163136451)

[Pivot Tables 31](#_Toc163136452)

[Application Tip 31](#_Toc163136453)

[Formatting Pivot Tables 31](#_Toc163136454)

[Application Tip 32](#_Toc163136455)

[Pivot Charts 33](#_Toc163136456)

[Dashboards 34](#_Toc163136457)

[Introduction to Dashboards 34](#_Toc163136458)

[Slicers 34](#_Toc163136459)

[Creating Slicers in Excel 34](#_Toc163136460)

# Excel Essentials

## Text to Columns

### Objective

Learn to split data from a single cell into multiple columns in Excel using the 'Text to Columns' feature.

### Steps

1. Locate your data: Ensure your data is in one cell, like A1, and separated by commas or another delimiter.
2. Access the 'Text to Columns' feature: Go to the 'Data' tab on the Excel ribbon. Look for the 'Text to Columns' option, usually found in the 'Data Tools' group.
3. Select your data: Click on the cell with your data (e.g., A1) to select it. If your data spans multiple rows, select the entire range (e.g., A1:A10).
4. Initiate 'Text to Columns': Click the 'Text to Columns' button. A wizard will open to guide you through the process.
5. Choose the file type: Select the 'Delimited' option when prompted. This choice means that characters like commas, tabs, or other specified delimiters separate your data fields.
6. Set the delimiter: In the next step of the wizard, specify the delimiter that your data uses (e.g., comma). Ensure the corresponding checkbox (e.g., Comma) is ticked. You will see a preview of how your data will appear in separate columns.
7. Format columns (optional): You can optionally set the data format for the resulting columns. For general data types, select the 'General' option. This step allows you to choose the format, like text, date, or number, for each column.
8. Complete the process: Click 'Finish' to execute the split. Your data will now be divided into separate columns based on the chosen delimiter, replacing the original comma-separated list in the cell.

## Cell Formatting

### Objective

Learn how to manipulate the display of data in Excel cells using the 'Format Cells' feature, covering text and number formatting, custom formatting, and date formatting.

### Overview

* Text and Number Formatting
* Custom Formatting
* Date Formatting

### Detailed Steps

* **Identifying Text or Number**: To determine whether a cell contains text or a number, click on the cell and check the formula bar. If the cell contains a number, it will display as a number in the formula bar. You can also right-click on the cell, select ‘Format Cells’, and see if it shows as ‘General’. If it does, it’s not a number.
* **Implementing Currency**: To add a currency symbol to a number, right-click on the cell, select ‘Format Cells’, then select ‘Currency’. Choose your desired currency and click ‘OK’. The number in the cell remains the same, but the currency symbol is added for visual display.
* **Custom Formatting**: To display large numbers in millions or billions, you can use custom formatting. Right-click on the cell, select ‘Format Cells’, then go to ‘Custom’. Start with a single hashtag (#). Each comma you add divides the number by 1000. Add a decimal point and zeros to show decimal places. To add a metric (like ‘million’ or ‘billion’), put it in quotation marks.

[$AED]#,,.00" M"

* **Date Formatting**: Excel follows the date format of your computer. To change the date format, right-click on the cell, select ‘Format Cells’, then go to ‘Custom’. Use ‘d’ for day, ‘m’ for month, and ‘y’ for year. Add additional letters to change the format (e.g., ‘ddd’ shows the day of the week).

"ddd dd-mm-yyyy"

Remember, always be aware of your regional settings in your computer when working with dates in Excel.

## Autofill and Flash Fill

### Objective

Learn to efficiently use Excel's Autofill and Flash Fill features for quick data entry and pattern-based data extraction.

### Auto Fill

* **Building a Sequence**: To build a sequence of numbers, you can either drag down the first number of the sequence or write down the first two numbers and then drag down. Excel will duplicate the number by default, but you can change this by clicking on the ‘Auto Fill Options’ icon that appears and selecting ‘Fill Series’.
* **Alphanumeric Sequences**: If you want to create a sequence with alphanumeric characters, ensure the last character is a number. Excel will then build the sequence when you drag down the cell.
* **Dates**: Auto Fill also works with dates. You can fill days, weekdays, months, or years based on your regional settings. For example, if you want to skip the weekends, you can select ‘Fill Weekdays’.

### Flash Fill

**Extracting Information**

Flash Fill allows you to extract information from a set of data without using formulas.

For example, if you have a list of full names and want to extract only the first names, type the first name correctly in the cell next to the first full name.

Then, go to the ‘Data’ tab and select ‘Flash Fill’. Excel will automatically fill in the rest of the first names for you. You can do the same to extract last names or any other information.

## Data Validation and Named Ranges

### Objective

Learn how to utilize Data Validation and Named Ranges in Excel to create controlled input fields like dropdown lists and manage cell references efficiently.

### Named Range

* **Creating a Named Range**: Select the cells you want to name, and then give it a name. For example, if you have a list of courses, you can select all the cells containing the course names and name the range ‘Course’.
* **Managing Named Ranges**: You can manage your named ranges in the ‘Formulas’ tab under ‘Name Manager’. Here, you can modify or expand your named ranges.

### Data Validation

* **Creating a Dropdown List**: If you want to restrict the user to only select values from a dropdown list, you can use data validation. Select the cell where you want the dropdown list, go to the ‘Data’ tab, and click on ‘Data Validation’.
* **Setting Validation Criteria**: In the data validation dialog box, change the validation criteria to ‘List’. In the source field, enter the name of your named range prefixed with an equal sign (e.g., ‘=Course’). Click ‘OK’ to create the dropdown list.
* **Applying to Multiple Cells**: If you want to apply the same dropdown list to multiple cells, simply drag down the cell with the dropdown list. The user will only be able to select values from the dropdown list and cannot type in their own values.

## Cell References

### Objective

Master the use of cell references in Excel, including relative, absolute, and mixed references, to ensure accurate calculations in your spreadsheets.

### Understanding Cell References

* **Relative Reference**: By default, Excel uses relative references. When you drag a formula down or to the right, Excel adjusts the cell references in the formula relative to the new location.

### Locking Cell References

* **Absolute Reference**: If you want to lock a cell reference so it doesn’t change when you drag the formula, you can use an absolute reference. To do this, add a dollar sign before the column letter and row number (e.g., =$C$2).
* **Mixed Reference**: If you only want to lock the row or the column, you can use a mixed reference. Add a dollar sign before the row number to lock the row (e.g., =C$2), or before the column letter to lock the column (e.g., =$C2).

### Using the F4 Key

**Toggling Cell References**: You can use the F4 key (or Fn + F4 on some keyboards) to toggle between relative, absolute, and mixed references. Click near the cell reference in the formula and press F4 to cycle through the options.

By understanding these reference types, you can solve many basic Excel problems and make your formulas more flexible and accurate.

## Excel Tables

### Objective

Learn how to transform raw data into an intelligent Excel table to streamline formula usage and enhance data analysis.

### Creating a Table

1. Select the entire data range you want to convert into a table.
2. Click on the Table button. Ensure there are no merged cells in your data as this can cause issues.
3. Excel will provide a fixed range for your data, indicated with a dollar symbol (e.g., =$A$1:$D$9995).
4. Check the box that says My table has headers if your data includes headers.
5. Click OK. Excel will automatically format your data as a table.

### Formatting and Naming the Table

1. Click anywhere in the table to reveal a new Table Tools tab.
2. Choose a design that suits your preference from the Design tab.
3. Give your table a unique name that relates to its content in the Table Name field.

### Expanding the Table

1. The table’s boundary is defined by an icon at the bottom right corner of the table.
2. To expand the table, you can manually drag this icon, or simply add new data in the row immediately below or the column immediately to the right of the table.

### Using Formulas with Tables

1. Excel tables make it easier to write formulas. For example, to count the total number of orders (rows), you can use the ROWS function with the table name as the array (e.g., =ROWS(Orders)).
2. To sum a specific column, use the SUM function with the table and column name (e.g., =SUM(Orders[Quantity])).
3. You can easily copy formulas and change the column name to calculate different aggregates (e.g., =SUM(Orders[Sales]) or =SUM(Orders[Profit])).

By using Excel tables, you can make your data more intelligent, your formulas easier to write, and your spreadsheets more manageable.

# Text Functions

## An Overview

Excel is not just about numbers, it’s also about text and data-related information. Text functions in Excel are essential for extracting the right kind of information needed for data analysis.

In the tutorial, different text functions are covered to understand how to use them appropriately to solve problems. It also explores how to combine different text functions in an organized and structured manner.

Overall, being comfortable with text functions in Excel is crucial for effective data transformation and analysis.

## Basic Text Functions

Learn how to use six basic text functions in Excel to clean and standardize data, enhancing readability and consistency.

### **Concatenate**

This function is used to combine blocks of text. For example, you can use it to combine the first name and last name in a full name column. The formula is =CONCATENATE(first name, " ", last name). Alternatively, you can use the ampersand symbol (&) to combine text: first name & " " & last name.

### **Trim**

The TRIM function is used to remove additional spaces within a cell. It gets rid of all the additional spaces in between blocks of text as well as before and after the text. The formula is =TRIM(text).

### **Len**

The LEN function is used to find out the length of a character. It returns the number of characters, including spaces. The formula is =LEN(text). This function can be useful when you want to set the length of a particular character and check whether the length is meeting your requirement.

### **Proper, Lower, and Upper**

These functions are used to convert the case of a cell. The PROPER function converts text to title case (the first letter of every word is capitalized), the LOWER function converts text to all lower case, and the UPPER function converts text to all upper case. The formulas are =PROPER(text), =LOWER(text), and =UPPER(text) respectively. These functions can make column values more legible and easier to read and understand.

By mastering these functions, you can effectively clean and manipulate your data in Excel.

## LEFT and RIGHT

### Objective

Learn to extract specific data from cells in Excel using the LEFT and RIGHT functions, ideal for parsing strings where relevant information is positioned at the start or end of the text.

### **LEFT Function**

This function extracts a specified number of characters from the left side of a cell. For example, if you have an employee ID column with IDs that are five characters long, and you want to extract these IDs, you can use the LEFT function.

The formula is =LEFT(cell, number of characters). In this case, if you want to extract the employee ID from cell B3, the formula would be =LEFT(B3, 5).

### **RIGHT Function**

This function works similarly to the LEFT function, but it extracts characters from the right side of a cell. If your employee IDs are aligned to the right of the cell and you want to extract them, you can use the RIGHT function.

The formula is =RIGHT(cell, number of characters). For example, to extract the employee ID from cell B9, the formula would be =RIGHT(B9, 5).

### Application Scenarios

These functions are extremely useful for data cleaning tasks where you need to isolate specific portions of a text string, such as codes, names, or numerical data, that are consistently positioned within a cell.

## MID

### Objective

Learn how to use the MID function in Excel to extract data from the middle of a text string in a cell, perfect for situations where the required data is not at the beginning or end.

### Steps

1. **Identify the Pattern**: First, identify the pattern in the data. For example, if you have an employee ID column where each ID is five characters long and is preceded by three hash characters, you can determine that the employee ID starts at the fourth character position.
2. **Use the MID Function**: The MID function has three parameters: text, start\_num, and num\_chars. The text parameter is the cell from which you want to extract data. The start\_num parameter is the position in the cell where you want to start extracting data. The num\_chars parameter is the number of characters you want to extract.

For example, if you want to extract the employee ID from cell B3, and you know that the ID starts at the fourth character and is five characters long, the formula would be =MID(B3, 4, 5).

1. **Apply the Formula**: After typing the formula, you can drag it down to apply it to other cells in the column. This will extract the employee ID from each cell, following the pattern you identified.

### Application Tips

Determine the Starting Point: Carefully identify where the desired data segment begins within the string. Count the Characters: Ensure you know how many characters you need to extract to avoid cutting off important information.

## FIND

### Objective

Discover how to use Excel's FIND function to replace to extract specific information from a cell, in this case, an employee ID. The FIND function is particularly useful when the data is not uniformly distributed within the cells.

### Steps

1. **Identify the Pattern**: In this case, the employee ID is located in the middle of the cell, starting with a capital letter ‘A’. However, the starting position varies in each cell.
2. **Use the FIND Function**: The FIND function in Excel has three parameters: find\_text, within\_text, and start\_num. The start\_num parameter is optional and defaults to 1 if left blank. In this case, find\_text is ‘A’, within\_text is the cell where we want to find ‘A’, and start\_num is left blank to start searching from the first position.

=FIND("A", B3)

1. **Understand the Output**: The FIND function returns the starting position of the employee ID in each cell. Note that the FIND function is case-sensitive.
2. **Combine with MID Function**: Once you have the starting position, you can use the MID function to extract the employee ID. The MID function requires three parameters: text, start\_num, and num\_chars. text is the cell from which you want to extract, start\_num is the starting position (which we get from the FIND function), and num\_chars is the number of characters you want to extract.

=MID(B3, FIND("A", B3), 5)

This formula will correctly extract the employee ID, even if additional characters are added to the cell. The FIND function ensures that the extraction starts from the correct position.

**SEARCH**

### Objective

Discover how to use Excel's SEARCH function in Excel to extract specific information from a cell, in this case, an employee ID. The SEARCH function is particularly useful when the data is not uniformly distributed within the cells and is not case sensitive.

### Steps

1. **Identify the Pattern**: In this case, the employee ID is located in the middle of the cell, starting with a letter ‘A’. However, the starting position varies in each cell and the case of the letter ‘A’ is not consistent.
2. **Use the SEARCH Function**: The SEARCH function in Excel has three parameters: find\_text, within\_text, and start\_num. The start\_num parameter is optional and defaults to 1 if left blank. In this case, find\_text is ‘A’, within\_text is the cell where we want to find ‘A’, and start\_num is left blank to start searching from the first position.

=SEARCH("A", B3)

1. **Understand the Output**: The SEARCH function returns the starting position of the employee ID in each cell. Note that the SEARCH function is not case-sensitive.
2. **Combine with MID Function**: Once you have the starting position, you can use the MID function to extract the employee ID. The MID function requires three parameters: text, start\_num, and num\_chars. text is the cell from which you want to extract, start\_num is the starting position (which we get from the SEARCH function), and num\_chars is the number of characters you want to extract.

=MID(B3, SEARCH("A", B3), 5)

This formula will correctly extract the employee ID, even if additional characters are added to the cell. The SEARCH function ensures that the extraction starts from the correct position.

1. **Using Wildcards**: The SEARCH function also works with wildcards. For example, if you want to extract all cells containing ‘Feb 2020’ but there are other pieces of information between ‘Feb’ and ‘2020’, you can use the asterisk symbol (\*) as a wildcard. This means any number of characters between ‘Feb’ and ‘2020’ are permitted.

=SEARCH("Feb\*2020", B3)

This formula will return the starting position of ‘Feb 2020’ in the cell, regardless of the number of characters between ‘Feb’ and ‘2020’. You can then use this with the MID function to extract the information.

## Substitute

The SUBSTITUTE function in Excel is a powerful tool for replacing specific text within a cell. Here’s how to use it:

1. **Identify the Text**: In this example, we have a set of phone numbers with varying characters that we want to remove.
2. **Use the SUBSTITUTE Function**: The SUBSTITUTE function has four parameters: text, old\_text, new\_text, and instance\_num. text is the cell you want to change, old\_text is the text you want to replace, new\_text is the text you want to replace old\_text with, and instance\_num is the specific occurrence of old\_text you want to replace.

=SUBSTITUTE(B3, "-", "")

This formula will replace all instances of the dash character with nothing, effectively removing them from the cell.

1. **Specify the Instance Number**: If you only want to replace a specific occurrence of old\_text, you can specify the instance\_num. For example, if you want to replace the first instance of “00” with “+”, you can use the following formula:

=SUBSTITUTE(B9, "00", "+", 1)

This formula will only replace the first instance of “00” with “+”. Note that instance\_num is not cumulative. If you specify instance\_num as 2, it will only replace the second instance of old\_text.

1. **Understand the Output**: The SUBSTITUTE function will return the modified text. If you drag the cell with the formula down, it will apply the formula to all cells in the column.

Remember, the SUBSTITUTE function is a powerful tool for manipulating text in Excel, but it requires a clear understanding of your data and what you want to achieve.

## VALUE

The VALUE function in Excel is used to convert a text string that represents a number to a number. Here’s how you can use it:

1. **Identify the Text to Remove**: If you have a column of data that contains numbers mixed with text (for example, weights with ‘KG’ appended), and you want to perform calculations on these numbers, you need to remove the text first.
2. **Use the SUBSTITUTE Function**: The SUBSTITUTE function can be used to replace specific text in a cell. For example, to remove ‘KG’ from cell E2, you would use the formula =SUBSTITUTE(E2, "KG", ""). Note that the SUBSTITUTE function is case-sensitive.
3. **Use the VALUE Function**: After using SUBSTITUTE, the cell might still not be recognized as a number by Excel. This is where the VALUE function comes in. It converts a text string that represents a number to a number. For example, =VALUE(SUBSTITUTE(E2, "KG", "")) would remove ‘KG’ from cell E2 and convert the remaining text to a number.
4. **Apply the Formula**: After typing the formula, you can drag it down to apply it to other cells in the column. This will convert all the text strings to numbers, allowing you to perform calculations on them.

### **Application Tip**

The VALUE function is particularly useful when you’re dealing with data that has been imported from another source and the numbers have been formatted as text. It allows you to convert these text strings to numbers so you can perform calculations on them.

For example, if you have a column of weights that have been formatted as text (e.g., ‘125KG’), you can use the VALUE function to convert these weights to numbers, allowing you to calculate the total weight.

# Logical and Conditional Aggregates

## **IF**

The IF function in Excel is a decision-making function that is great for working with spreadsheets. Here’s how you can use it:

1. **Identify the Criteria**: If you have a spreadsheet with sales transactions and you want to fill a status column based on whether the revenue is greater than or equal to the average revenue, you can use the IF function.
2. **Use the IF Function**: The IF function takes three arguments: the condition to check, the value to return if the condition is true, and the value to return if the condition is false. For example, to check if the revenue in cell B2 is greater than or equal to the average revenue in cell C2, you would use the formula =IF(B2>=C2, "High", "Low").
3. **Round Up Values**: If you want to consider values that are close to the average revenue as ‘High’, you can use the ROUNDUP function to round the revenue up to the nearest whole number before checking the condition. For example, =IF(ROUNDUP(B2, 0)>=C2, "High", "Low").
4. **Apply the Formula**: After typing the formula, you can drag it down to apply it to other cells in the column. This will fill the status column based on whether the revenue is greater than or equal to the average revenue.

### **Application Tip**

The IF function is particularly useful when you’re dealing with data that needs to be categorized based on certain criteria.

For example, if you have a spreadsheet of sales transactions and you want to categorize them based on revenue, you can use the IF function to do this. This allows you to quickly and easily see which transactions have high or low revenue.

## AND/OR

The AND and OR functions in Excel are logical functions that can be used to check multiple conditions at once. Here’s how you can use them:

1. **Identify the Criteria**: If you have a spreadsheet with sales transactions and you want to fill a status column based on whether the revenue is greater than or equal to the average revenue and the profit margin is greater than 15%, you can use the AND function.
2. **Use the AND Function**: The AND function checks multiple conditions and returns TRUE if all conditions are true, and FALSE otherwise. For example, to check if the revenue in cell B2 is greater than or equal to the average revenue in cell C2 and the profit margin in cell D2 is greater than 15%, you would use the formula =AND(B2>=C2, D2>15).
3. **Use the OR Function**: The OR function checks multiple conditions and returns TRUE if at least one condition is true, and FALSE otherwise. For example, to check if either the revenue in cell B2 is greater than or equal to the average revenue in cell C2 or the profit margin in cell D2 is greater than 15%, you would use the formula =OR(B2>=C2, D2>15).
4. **Combine with the IF Function**: You can combine the AND or OR function with the IF function to return specific values based on the conditions. For example, =IF(AND(B2>=C2, D2>15), "High", "Low") will return ‘High’ if both conditions are true and ‘Low’ otherwise.

### **Application Tip**

The AND and OR functions are particularly useful when you’re dealing with data that needs to be categorized based on multiple criteria.

For example, if you have a spreadsheet of sales transactions and you want to categorize them based on revenue and profit margin, you can use the AND and OR functions to do this. This allows you to quickly and easily see which transactions meet certain criteria.

## IFERROR

The IFERROR function in Excel is a logical function that can be used to handle errors in your formulas. Here’s how you can use it:

1. **Identify the Error**: If you have a spreadsheet with sales transactions and you notice an error in your calculations because a cell contains text instead of a number, you can use the IFERROR function.
2. **Use the VALUE Function**: The VALUE function in Excel converts a text string that represents a number to a number. If it cannot convert the text into a number, it returns an error. For example, to convert the revenue in cell B2 into a number, you would use the formula =VALUE(B2).
3. **Use the IFERROR Function**: The IFERROR function checks whether a formula has an error and returns a custom result if true, and the formula’s result if false. For example, to check if the VALUE function returns an error and return ‘Invalid’ if true, you would use the formula =IFERROR(VALUE(B2), "Invalid").
4. **Combine with the IF Function**: You can combine the IFERROR function with the IF function to handle errors in your conditions. For example, =IFERROR(IF(VALUE(B2)>=C2, "High", "Low"), "Invalid") will return ‘High’ if the revenue is greater than or equal to the average, ‘Low’ if less, and ‘Invalid’ if the revenue is not a number.

### **Application Tip**

The IFERROR function is particularly useful when you’re dealing with data that may contain errors.

For example, if you have a spreadsheet of sales transactions and some cells in the revenue column contain text instead of numbers, you can use the IFERROR function to return ‘Invalid’ for these cells. This allows you to quickly and easily identify which transactions have issues.

## SUMIF

### Objective

Learn to use the SUMIF function in Excel to sum values based on a specific condition, ideal for aggregating data like daily sales transactions.

### Steps

1. **Identify the Data**: Suppose you have a data sheet with a list of sales transactions, including dates and revenue values. Some dates may have multiple transactions.
2. **Specify the Criteria**: Decide on the criteria for which you want to add up the values. For example, you might want to sum the revenues for a specific date.
3. **Use the SUMIF Function**: The SUMIF function takes three arguments: the range, the criteria, and the sum range. The range is where you want to apply your criteria, the criteria is what you want to match, and the sum range is the cells to sum if the criteria is met.

For example, if you want to sum the revenues for January 1, 2020, you would use the formula =SUMIF(Sales02[Date], "1/1/2020", Sales02[Revenue]).

This formula checks each date in the Date column of Table13, and for each date that matches “1/1/2020”, it adds the corresponding revenue from the Revenue column.

1. **Apply the Formula**: After typing in the formula, press Enter to execute it. If done correctly, the cell should display the sum of revenues for the specified date.
2. **Drag the Formula**: To apply the formula to other cells, click on the cell with the formula, then click and drag the fill handle (the small square at the bottom-right of the cell) down to the other cells.

### **Application Tip**

The SUMIF function is particularly useful when you’re dealing with data that has multiple entries for each category and you want to get a total for each category.

For example, if you have a spreadsheet of sales transactions and you want to know the total revenue for each date, you can use the SUMIF function to quickly and easily get these totals.

## SUMIFS

The SUMIFS function in Excel is used to add up values based on multiple criteria. Here’s how you can use it:

1. **Identify the Data**: Suppose you have a data sheet with a list of sales transactions, including sales rep, product, and revenue values.
2. **Specify the Criteria**: Decide on the criteria for which you want to add up the values. For example, you might want to sum the revenues for sales made by “Trevor Jones” for the product “Majestic Beauty”.
3. **Use the SUMIFS Function**: The SUMIFS function takes the sum range as the first argument, followed by pairs of criteria range and criteria. The sum range is the cells to sum if the criteria are met, the criteria range is where you want to apply your criteria, and the criteria is what you want to match.

For example, if you want to sum the revenues for sales made by “Trevor Jones” for the product “Majestic Beauty”, you would use the formula =SUMIFS(Sales03[Revenue], Sales03[Sales Rep], "Trevor Jones", Sales03[Product], "Majestic Beauty").

This formula checks each sales rep and product in the Sales Rep and Product columns of Table7, and for each row where the sales rep matches “Trevor Jones” and the product matches “Majestic Beauty”, it adds the corresponding revenue from the Revenue column.

1. **Apply the Formula**: After typing in the formula, press Enter to execute it. If done correctly, the cell should display the sum of revenues for the specified sales rep and product.

### **Application Tip**

The SUMIFS function is particularly useful when you’re dealing with data that has multiple entries for each category and you want to get a total for each combination of categories.

For example, if you have a spreadsheet of sales transactions and you want to know the total revenue for each sales rep for each product, you can use the SUMIFS function to quickly and easily get these totals.

# Date and Time Functions

## DATEVALUE

The DATEVALUE function in Excel is used to convert string-based dates into actual date formats. Here’s how you can use it:

1. **Identify the Data**: Suppose you have a column named “Purchase Date” which contains dates in different formats, including some spaces.
2. **Use the DATEVALUE Function**: The DATEVALUE function takes only one argument, the date text. For example, if you want to convert the string-based dates in the “Purchase Date” column into actual date formats, you would use the formula =DATEVALUE(A2), where A2 is the cell containing the string-based date.
3. **Apply the Formula**: After typing in the formula, press Enter to execute it. The cell should now display a numeric value, which represents the number of days that have elapsed since January 1, 1900.
4. **Convert to Date Format**: To convert this numeric value into a date format, select the cell, right-click, and choose “Format Cells”. Under the “Number” tab, select “Date” and choose the date format you want to work with.

### **Application Tip**

The DATEVALUE function is particularly useful when you’re dealing with data that contains dates in string format and you want to perform date-time calculations. For example, if you have a spreadsheet of purchase transactions with dates in string format, you can use the DATEVALUE function to convert these dates into actual date formats, enabling you to calculate things like the number of days between purchases.

## EDATE AND EOMONTH

The EDATE and EOMONTH functions in Excel are used to perform date-time calculations. Here’s how you can use them:

1. **Identify the Data**: Suppose you have some sales transactions data and you want to calculate the number of units sold within a certain time duration.
2. **Specify the Start Date**: Let’s say the start date is 1st of July 2013.
3. **Specify the Time Duration**: For this example, let’s consider a time duration of six months.
4. **Use the EDATE Function**: The EDATE function takes two arguments - the start date and the total number of months. For example, if you want to find the exact date six months after the start date, you would use the formula =EDATE(A2, B2), where A2 is the cell containing the start date and B2 is the cell containing the number of months.
5. **Use the EOMONTH Function**: If you want to find the end date of the month, six months after the start date, you can use the EOMONTH function. The formula would be =EOMONTH(A2, B2). The arguments are the same as the EDATE function.

### **Application Tip**

The EDATE and EOMONTH functions are particularly useful when you’re dealing with sales data and you want to perform calculations based on specific time durations. For example, if you want to calculate the number of units sold within a certain number of months from a specific start date, you can use these functions to determine the exact end date or the end of the month date for that time duration.

## DATEDIF

The DATEDIF function in Excel is used to calculate the difference between two dates. Here’s how you can use it:

1. **Simple Subtraction**: Without using any functions, you can find out the number of days elapsed between two dates using simple subtraction. For example, if you have an end date and a start date, you can subtract the start date from the end date to get the number of days elapsed.
2. **Use the DATEDIF Function**: If you want to find out the number of days, months, or years that have elapsed between two dates, you can use the DATEDIF function. The function takes three arguments: the start date, the end date, and the unit of time you want the result to be shown in.
   * **Days**: To calculate the number of days, use “D” as the third argument. For example, =DATEDIF(A2, B2, "D"), where A2 is the cell containing the start date and B2 is the cell containing the end date.
   * **Months**: To calculate the number of months, use “M” as the third argument. For example, =DATEDIF(A2, B2, "M").
   * **Years**: To calculate the number of years, use “Y” as the third argument. For example, =DATEDIF(A2, B2, "Y").
   * **Months after Years**: To calculate the number of months after Years, use “YM” as the third argument. For example, =DATEDIF(A2, B2, "YM").

### **Application Tip**

The DATEDIF function is particularly useful when you’re dealing with data that spans over different periods of time.

For example, if you want to calculate the number of days, months, or years that have elapsed since the last incident, you can use this function to get accurate results.

## WORKDAY

The WORKDAY function in Excel is used to find a resulting working day after a certain number of elapsed working days. Here’s how you can use it:

1. **Basic Usage**: The WORKDAY function takes two mandatory parameters and one optional parameter. The first parameter is the start date, and the second parameter is the total number of working days you want to consider. The function will then return the date after the specified number of working days from the start date. For example, =WORKDAY(A2, 30), where A2 is the cell containing the start date.
2. **Considering Holidays**: If you want to consider holidays, you can specify them as a range in the third parameter. For example, =WORKDAY(A2, 30, C2:C9), where C2:C9 is the range of cells containing the holiday dates.
3. **Using WORKDAY.INTL**: If you want to specify which days of the week are considered weekends, you can use the WORKDAY.INTL function. This function takes an additional parameter where you can specify the weekend days using a set of codes or a seven-character string representing each day of the week. For example, =WORKDAY.INTL(A2, 30, "0000011") considers Friday and Saturday as weekends.

### **Application Tip**

The WORKDAY and WORKDAY.INTL functions are particularly useful when you’re dealing with project management or event planning scenarios.

For example, if you want to calculate the payment date for an event organizer based on the completion of a certain number of working days, you can use these functions to get accurate results. These functions consider only the working days and exclude the weekends and holidays, providing a more realistic timeline.

## NETWORKDAYS

The NETWORKDAYS function in Excel is used to calculate the number of working days between two given dates. Here’s how you can use it:

1. **Basic Usage**: The NETWORKDAYS function takes two mandatory parameters: a start date and an end date. The function will then return the total number of working days between these two dates, excluding weekends. For example, =NETWORKDAYS(A2, B2), where A2 is the cell containing the start date and B2 is the cell containing the end date.
2. **Considering Holidays**: If you want to exclude holidays, you can specify them as a range in the third parameter. For example, =NETWORKDAYS(A2, B2, C2:C9), where C2:C9 is the range of cells containing the holiday dates.

### **Application Tip**

The NETWORKDAYS function is particularly useful when you’re dealing with project management or HR scenarios.

For example, if you want to calculate the total number of working days for a project or to track employee attendance, you can use this function to get accurate results. This function considers only the working days and excludes the weekends and specified holidays, providing a more realistic timeline.

# Look Up Functions

## VLOOKUP

### Objective

Learn how to use the VLOOKUP function in Excel to populate missing data from another sheet or workbook based on a common identifier.

The VLOOKUP function in Excel is used to look up and retrieve data from a column in a table array based on a specified criterion. Here’s how you can use it:

* **Basic Usage**: The VLOOKUP function takes four parameters: lookup value, table array, column index number, and range lookup.

For example, =VLOOKUP(A2, SalesRepMaster, 2, FALSE), where A2 is the cell containing the lookup value (sales representative name), SalesRepMaster is the named range of the table array, 2 is the column index number (region column), and FALSE indicates that we want an exact match.

* **Dynamic Column Indexing**: Instead of manually specifying the column index number, you can automate this process by using the COLUMN and INDIRECT functions.

For example, =VLOOKUP(A2, SalesRepMaster, COLUMN(INDIRECT("SalesRepMaster[CustomerName]")), FALSE). This formula dynamically fetches the column number of the ‘CustomerName’ column in the ‘SalesRepMaster’ table.

* **Limitation**: The VLOOKUP function always looks for the lookup value in the leftmost column of the table array. If the lookup value is not in the leftmost column, the function will return an error. This is a limitation of the VLOOKUP function.

### **Application Tip**

The VLOOKUP function is particularly useful when you’re dealing with large datasets and you need to retrieve specific data based on a certain criterion.

For example, if you have a sales transactions sheet and a sales representative master sheet, you can use VLOOKUP to fill in missing data in the transactions sheet based on the data in the master sheet. This function is also useful for creating dynamic summaries of your data.

# Basic Charts

Learn to create and customize Pie, Bar, and Line charts in Excel to visually represent data, enhancing understanding and presentation.

## Pie Chart

Best for showing the proportion of categories as part of a whole.

### Steps

* Select the data you want to represent in the pie chart.
* Go to the 'Insert' tab, click on 'Insert Pie or Doughnut Chart', and choose your preferred pie chart style.
* Customize the chart with labels, colors, and legends as needed.

## Bar Chart

Ideal for comparing quantities across different categories.

### Steps

* Highlight the data that you want to illustrate with a bar chart.
* Click on the 'Insert' tab, select 'Bar Chart', and pick the type of bar chart you want to use (horizontal, vertical, stacked, etc.).
* Adjust the chart's design, layout, and format for better clarity and aesthetics.

## Line Chart

Suitable for displaying trends over time or continuous data.

### Steps

* Select the data range for your line chart, including dates or time on one axis and the corresponding values on the other.
* Navigate to the 'Insert' tab, choose 'Line Chart', and select the line chart variant that fits your data.
* Customize the chart with titles, axis labels, and other elements to enhance understanding.

## Customization Tips

Use legends and labels for clear data representation and to aid in data interpretation. Select colors that ensure good contrast and readability. Adjust the data series to highlight key trends or differences.

# Pivot Tables

Pivot Tables in Excel are powerful tools for summarizing, analyzing, exploring, and presenting your data. Here’s how you can use them:

* **Basic Usage**: To create a pivot table, click anywhere in your table, go to the Insert tab, and select Pivot Table. Excel will automatically identify the table name and suggest creating the pivot table in a new worksheet.
* **Row Field**: Drag the field you want to display in the rows of your pivot table to the Rows area. For example, if you want to display loan statuses (defaulted or fully paid), drag the Loan Status field to the Rows area.
* **Value Field**: Drag the field you want to summarize or calculate to the Values area. If you drag a numeric field, Excel will sum the values by default. If you drag a text field, Excel will count the values. For example, to count the number of customers for each loan status, drag the Customer ID field (or any other text field) to the Values area.
* **Column Field**: If you want to break down your summarized data by another category, you can drag another field to the Columns area. For example, to show the count of customers for each loan status broken down by home ownership status, drag the Home Ownership field to the Columns area.
* **Filter Field**: If you want to analyze a subset of your data, you can drag a field to the Filters area. This will allow you to select one or more items from that field to include in your pivot table. For example, to analyze only the loan transactions for which people wanted to buy a car or a house, drag the Purpose field to the Filters area and select Car and House.
* **Planning Your Analysis**: Before creating a pivot table, it’s helpful to plan out what you want to analyze and how you want to present your data. This will make it easier to set up your pivot table and save you time.

### **Application Tip**

Pivot tables are particularly useful when you’re dealing with large datasets and you need to summarize your data in different ways based on different categories.

For example, if you have a dataset of loan transactions, you can use a pivot table to count the number of customers who have defaulted or fully paid their loans, broken down by home ownership status, and further filter the data based on the purpose of the loan.

### **Formatting Pivot Tables**

Pivot Tables in Excel can be formatted to improve their appearance and make them easier to read. Here’s how you can format them:

* **Styling**: Click anywhere on the pivot table to bring up the Design tab. Here, you can choose from a variety of styles. You can also create custom styles to match your organization’s branding.
* **Subtotals**: Under the Design tab, you can choose to show or hide subtotals. You can also choose to show all subtotals at the top or bottom of the group.
* **Grand Totals**: You can choose to show grand totals for rows, columns, both, or neither. If you change the layout of your pivot table (for example, by moving a field from Rows to Columns), you may see grand totals at both the row and column levels.
* **Report Layout**: The default report layout is Compact Form, which shows all fields in a single column. If you switch to Outline Form or Tabular Form, each field will be shown in a separate column. You can also choose to repeat all item labels, which can be useful if you want to copy the pivot table data to another location.
* **Additional Formatting Options**: There are additional options for showing or hiding row and column headers, banding rows and columns, and handling blank rows.

Remember, the key to effectively formatting pivot tables is to consider how you want to present your data and then explore the formatting options to achieve that presentation.

### **Application Tip**

Formatting is crucial when you’re preparing a report or dashboard for others. A well-formatted pivot table can make your data easier to understand and more professional-looking.

For example, if you’re preparing a report on loan statuses, you might want to use a custom style that matches your organization’s branding, show subtotals for each loan status, and use a tabular form layout with repeated item labels for clarity.

## Pivot Charts

Pivot Charts in Excel are a powerful tool for data visualization. Here’s how you can create and customize them:

1. **Creating a Pivot Chart**: Once you have a pivot table ready, creating a chart is a one-click activity. You can do this by clicking on the ‘PivotTable Analyze’ tab and then on ‘PivotChart’, or by going to the ‘Insert’ tab and selecting ‘PivotChart’.
2. **Choosing the Chart Type**: By default, Excel gives you a clustered column chart. However, you can change the chart type to better suit your data. For example, if you’re working with timeline data, a line chart might be more appropriate.
3. **Filtering Data**: Pivot charts replicate some of the features of pivot tables, including the ability to filter data directly from the chart. You can filter the fields that have been added to the chart.
4. **Expanding and Collapsing the Chart View**: If your pivot table has multiple rows, you can expand or collapse the chart view to show more or less detail.
5. **Working with Dates**: If you’re working with dates, you can group them by month, quarter, or year. To do this, right-click on the area where the dates are displayed, click on ‘Group’, and select the parameters you want. If you want to show data for individual days, you can add ‘Days’ as well.
6. **Changing the Chart Layout**: You can change the layout of your pivot chart without creating a new one. Simply click on the existing chart and change the chart type.

Remember, the key to effectively using pivot charts is to consider how you want to present your data and then explore the chart options to achieve that presentation. With a bit of practice, you’ll be able to create insightful and professional-looking charts.

# Dashboards

## **Introduction to Dashboards**

Excel is a powerful tool for creating dashboards, especially when your data resides within Excel itself. This is a cost-effective alternative if you don’t have access to resources like Power BI or Tableau.

* **Understanding Pivot Tables**: The data for the dashboard comes from pivot tables. A sheet named ‘Pivot’ contains four pivot tables that feed data into the dashboard. Knowledge of pivot tables is crucial for working on dashboards, although direct formulas can also be used.
* **Data Source**: The raw data for this tutorial is dummy data of customers customers for multiple years.
* **Dashboard Demo**: The dashboard has a slicer at the top, showing the years. Based on the selection in the slicer, the charts and tabulated values below automatically update.

For example, selecting the year 2024 changes the chart and tabulated values accordingly. This is how the dashboard should work - values should change across the dashboard based on the selection. However, there can be exceptions where certain charts do not change based on the selection.

## Slicers

### **Creating Slicers in Excel**

This tutorial will guide you on how to create slicers and add them to a dashboard in Excel. The data set used for this tutorial is the past data of customer orders.

1. **Creating a Pivot Table**: The first step is to create a pivot table from the raw data. The table is named ‘orders’. For the slicer, the ‘order date’ is selected and dragged to rows in the pivot table. The ‘sales is then dragged to values, which shows the total sales by year.
2. **Creating a Slicer**: To create a slicer, click on the ‘Insert’ tab and select ‘Slicer’. When asked for the field for the slicer, select ‘order date’. The label shown on the slicer will reflect the same label as in the pivot table. Therefore, ensure that you select the most appropriate group under your pivot table based on your requirement.
3. **Adding the Slicer to the Dashboard**: Cut the slicer from its current location and paste it onto the dashboard. Adjust its layout and position as per your preference. If you want to see all the years in the same column change the ‘Columns’ value to match the number of years in the slicer tab.
4. **Using the Slicer**: Now that the slicer is created and added to the dashboard, you can select values from the slicer and see the corresponding values change across the dashboard.