1.What do you mean by “Relative Cell Referencing” in MS Excel and “Absolute cell referencing”?

Ans

In working with spreadsheets, you need to know about relative vs. absolute cell references.

Here is the issue: when you COPY A FORMULA that contains cell references, what happens to the cell references?

Usually the CELL REFERENCES will CHANGE! If you copy a formula 2 rows to the right, then the cell references in the formula will shift 2 cells to the right. If you copy a formula 3 rows down and 1 row left, then the cell references in the formula will shift 3 rows down and 1 row left. These are called "relative" cell references, since they change relative to where you copy the formula.

If you do not want cell references to change when you copy a formula, then make those cell references absolute cell references. Place a "$" before the column letter if you want that to always stay the same. Place a "$" before a row number if you want that to always stay the same. For example, "$C$3" refers to cell C3, and "$C$3" will work exactly the same as "C3", expect when you copy the formula. Note: when entering formulas you can use the F4 key right after entering a cell reference to toggle among the different relative/absolute versions of that cell address.

The trick in creating spreadsheets is deciding before you copy a formula what cell references in the formula you want to be relative and what you want to be absolute. If some cell references refer to input cells in the spreadsheet, you usually want those cells to be absolute.

The article below gives further instruction in absolute vs. relative cell references.

|  |  |
| --- | --- |
| **Relative & Absolute Cell References** | |
| http://web.pdx.edu/~stipakb/CellRefs/dot_clea.gif | |
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| http://web.pdx.edu/~stipakb/CellRefs/dot_clea.gif |
| ***by******Karyn Stille***  Excel uses two types of cell references to create formulas.  Each has its own purpose.  Read on to determine which type of cell reference to use for your formula.  **Relative Cell References**  This is the most widely used type of cell reference in formulas.  Relative cell references are basic cell references that adjust and change when copied or when using AutoFill.  Example:  =SUM(B5:B8), as shown below, changes to =SUM(C5:C8) when copied across to the next cell.  http://web.pdx.edu/~stipakb/CellRefs/excelrel1.gif  http://web.pdx.edu/~stipakb/CellRefs/excelrel2.gif  **Absolute Cell References**  Situations arise in which the cell reference must remain the same when copied or when using AutoFill.  Dollar signs are used to hold a column and/or row reference constant.  Example:  In the example below, when calculating commissions for sales staff, you would not want cell B10 to change when copying the formula down.  You want both the column and the row to remain the same to refer to that exact cell.  By using $B$10 in the formula, neither changes when copied.  http://web.pdx.edu/~stipakb/CellRefs/excellfill1.gif  http://web.pdx.edu/~stipakb/CellRefs/excelfill2.gif  A more complicated example:  Let's pretend that you need to calculate the prices of items in stock with two different price discounts. Take a look at the worksheet below.  http://web.pdx.edu/~stipakb/CellRefs/excelrel3.gif  Examine the formula in cell E4. By making the first cell reference $C4, you keep the column from changing when copied across, but allow the row to change when copying down to accommodate the prices of the different items going down.  By making the last cell reference A$12, you keep the row number from changing when copied down, but allow the column to change and reflect discount B when copied across.  Confused?  Check out the graphics below and the cell results.  Copied Across http://web.pdx.edu/~stipakb/CellRefs/excelrel4.gif  Copied Down http://web.pdx.edu/~stipakb/CellRefs/excelrel5.gif  Now, you might be thinking, why not just use 10% and 15% in the actual formulas?  Wouldn't that be easier? Yes, if you are sure the discount percentages will never change - which is highly unlikely.  It's more likely that eventually those percentages will need to be adjusted.  By referencing the *cells* containing 10% and 15% and not the actual numbers, when the percentage changes all you need to do is change the percentage one time in cell A12 and/or B12 instead of rebuilding all of your formulas. Excel would automatically update the discount prices to reflect your discount percentage change.  **Summary of absolute cell reference uses:**   |  |  | | --- | --- | | $A1 | Allows the row reference to change, but not the column reference. | | A$1 | Allows the column reference to change, but not the row reference. | | $A$1 | Allows neither the column nor the row reference to change. |   There is a shortcut for placing absolute cell references in your formulas!  When you are typing your formula, after you type a cell reference - press the **F4** key.  Excel automatically makes the cell reference absolute!  By continuing to press **F4**, Excel will cycle through all of the absolute reference possibilities.  For example, in the first absolute cell reference formula in this tutorial, =B4\*$B$10, I could have typed, =B4\*B10, then pressed the **F4** key to change B10 to $B$10.  Continuing to press **F4** would have resulted in B$10, then $B10, and finally B10. Pressing **F4** changes only the cell reference directly to the left of your insertion point. | |

2.How to secure an excel workbook, demonstrate it with an example.

Ans

To prevent other users from viewing hidden worksheets, adding, moving, deleting, or hiding worksheets, and renaming worksheets, you can protect the structure of your Excel workbook with a password.

**Note:**The screen shots in this article were taken in Excel 2016. If you have a different version your view might be slightly different, but unless otherwise noted, the functionality is the same.

xample of Workbook structure

**Notes:**Protecting the workbook is not the same as protecting an Excel file or a worksheet with a password. See below for more information:

* To lock your file so that other users can't open it, see [Protect an Excel file](https://support.microsoft.com/en-us/office/protect-an-excel-file-7359d4ae-7213-4ac2-b058-f75e9311b599).
* To protect certain areas of the data in your worksheet from other users, you have to protect your worksheet. For more information, see [Protect a worksheet](https://support.microsoft.com/en-us/office/protect-a-worksheet-3179efdb-1285-4d49-a9c3-f4ca36276de6).
* To know the difference between protecting your Excel file, workbook, or a worksheet, see [Protection and security in Excel](https://support.microsoft.com/en-us/office/protection-and-security-in-excel-be0b34db-8cb6-44dd-a673-0b3e3475ac2d).

Protect the workbook structure

To protect the structure of your workbook, follow these steps:

1. Click **Review** > **Protect Workbook**.
2. **Note:**The **Windows** option is available only in Excel 2007, Excel 2010, Excel for Mac 2011, and Excel 2016 for Mac. Select the **Windows** option if you want to prevent users from moving, resizing, or closing the workbook window, or hide/unhide windows.
3. Enter a password in the **Password** box.

**Important:**The password is optional. If you do not supply a password, any user can unprotect and change the workbook. If you do enter a password, make sure that you choose a password that is easy to remember. Write your passwords down and store them someplace safe. If you lose them, Excel cannot recover them for you.

1. Select **OK**, re-enter the password to confirm it, and then select **OK** again.

3.Explain the pivot tables and their implementations.

Ans

A [Pivot Table](https://en.wikipedia.org/wiki/Pivot_table) is one of the basic data analysis tools. Pivot Tables can quickly answer many important business questions.

One of the reasons we build Pivot Tables is to pass information. We would like to support our story with data that is easy to understand, easy to see.

Although Pivot Tables are only tables and thus missing real visuals, they can still be considered as a mean of [Visual Storytelling](https://www.visualstorytell.com/blog/what-is-visual-storytelling).

For you to get a better understanding of what we discuss, feel free to play with the pivot tables first. Then you can continue reading.

A Pivot Table is used to summarise, sort, reorganise, group, count, total or average data stored in a table. It allows us to transform columns into rows and rows into columns. It allows grouping by any field (column), and using advanced calculations on them.

Use a pivot table to build a list of unique values. Because pivot tables summarize data, they can be used to find unique values in a table column. This is a good way to quickly see all the values that appear in a field and also find typos, and other inconsistencies. [<https://exceljet.net/pivot-table-tips>]

More simple explanation is that **a pivot table can:**

* group items/records/rows into categories
* count the number of items in each category,
* sum the items value
* or compute average, find minimal or maximal value etc.

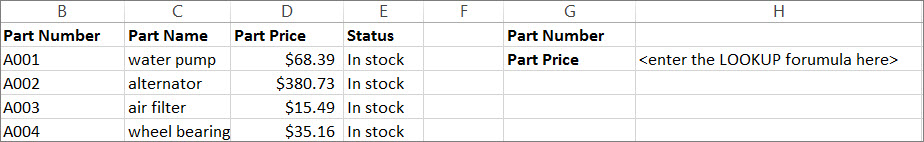
In a few easy steps, we will see how pivot tables work. Then, no pivot table creating will seem hard anymore.

4.Explain lookup in excel with suitable examples.

Ans

Use LOOKUP, one of the [lookup and reference functions](https://support.microsoft.com/en-us/office/excel-functions-by-category-5f91f4e9-7b42-46d2-9bd1-63f26a86c0eb#__toc309306714), when you need to look in a single row or column and find a value from the same position in a second row or column.

For example, let's say you know the part number for an auto part, but you don't know the price. You can use the LOOKUP function to return the price in cell H2 when you enter the auto part number in cell H1.



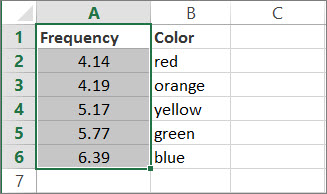
Use the LOOKUP function to search one row or one column. In the above example, we're searching prices in column D.

**Tips:**Consider one of the newer lookup functions, depending on which version of Office you are using.

* Use [**VLOOKUP**](https://support.microsoft.com/en-us/office/vlookup-function-0bbc8083-26fe-4963-8ab8-93a18ad188a1) to search one row or column, or to search multiple rows and columns (like a table). **It's a much improved version of LOOKUP**. [**Watch this video about how to use VLOOKUP**](https://support.microsoft.com/en-us/office/video-vlookup-when-and-how-to-use-it-9a86157a-5542-4148-a536-724823014785).
* If you are using Microsoft 365, use [**XLOOKUP**](https://support.microsoft.com/en-us/office/xlookup-function-b7fd680e-6d10-43e6-84f9-88eae8bf5929) - it's not only faster, it also lets you search in any direction (up, down, left, right).

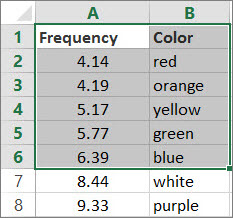
## **There are two ways to use LOOKUP: Vector form and Array form**

* [Vector form](https://support.microsoft.com/en-us/office/lookup-function-446d94af-663b-451d-8251-369d5e3864cb#bmvector_form): Use this form of LOOKUP to search one row or one column for a value. Use the vector form when you want to specify the range that contains the values that you want to match. For example, if you want to search for a value in column A, down to row 6.



* [Array form](https://support.microsoft.com/en-us/office/lookup-function-446d94af-663b-451d-8251-369d5e3864cb#bmarray_form): We strongly recommend using [**VLOOKUP**](https://support.microsoft.com/en-us/office/vlookup-function-0bbc8083-26fe-4963-8ab8-93a18ad188a1) or [**HLOOKUP**](https://support.microsoft.com/en-us/office/hlookup-function-a3034eec-b719-4ba3-bb65-e1ad662ed95f) instead of the array form. [**Watch this video about using VLOOKUP**](https://support.microsoft.com/en-us/office/video-vlookup-when-and-how-to-use-it-9a86157a-5542-4148-a536-724823014785). The array form is provided for compatibility with other spreadsheet programs, but it's functionality is limited.

An array is a collection of values in rows and columns (like a table) that you want to search. For example, if you want to search columns A and B, down to row 6. LOOKUP will return the nearest match. To use the array form, your data must be sorted.



## **Vector form**

The vector form of **LOOKUP** looks in a one-row or one-column range (known as a vector) for a value and returns a value from the same position in a second one-row or one-column range.

### Syntax

LOOKUP(lookup\_value, lookup\_vector, [result\_vector])

The **LOOKUP** function vector form syntax has the following arguments:

* **lookup\_value**    Required. A value that **LOOKUP** searches for in the first vector. ***Lookup\_value*** can be a number, text, a logical value, or a name or reference that refers to a value.
* **lookup\_vector**    Required. A range that contains only one row or one column. The values in ***lookup\_vector*** can be text, numbers, or logical values.

**Important:**The values in ***lookup\_vector*** must be placed in ascending order: ..., -2, -1, 0, 1, 2, ..., A-Z, FALSE, TRUE; otherwise, **LOOKUP** might not return the correct value. Uppercase and lowercase text are equivalent.

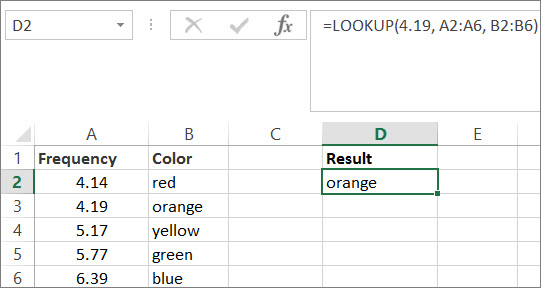
* **result\_vector**    Optional. A range that contains only one row or column. The ***result\_vector*** argument must be the same size as ***lookup\_vector***. It has to be the same size.

### Remarks

* If the **LOOKUP** function can't find the ***lookup\_value***, the function matches the largest value in ***lookup\_vector*** that is less than or equal to ***lookup\_value***.
* If ***lookup\_value*** is smaller than the smallest value in ***lookup\_vector***, **LOOKUP** returns the #N/A error value.

## **Vector examples**

You can try out these examples in your own Excel worksheet to learn how the LOOKUP function works. In the first example, you're going to end up with a spreadsheet that looks similar to this one:



5.What is Data validation, and how to implement it in Excel?

Ans

Data validation can help control what a user can enter into a cell. You can use data validation to make sure a value is a number, a date, or to present a dropdown menu with predefined choices to a user. This guide provides an overview of the data validation feature

Data validation is a feature in Excel used to control what a user can enter into a cell. For example, you could use data validation to make sure a value is a number between 1 and 6, make sure a date occurs in the next 30 days, or make sure a text entry is less than 25 characters.

Data validation can simply display a message to a user telling them what is allowed as shown below:

Data validation can also stop invalid user input. For example, if a product code fails validation, you can display a message like this:

In addition, data validation can be used to present the user with a predefined choice in a dropdown menu:

This can be a convenient way to give a user exactly the values that meet requirements.

**Data validation controls**

Data validation is implemented via rules defined in Excel's user interface on the Data tab of the ribbon.

**Important limitation**

*It is important to understand that data validation can be easily defeated. If a user copies data from a cell without validation to a cell with data validation, the validation is destroyed (or replaced). Data validation is a good way to let users know what is allowed or expected, but it is not a foolproof way to guarantee input.*

**Defining data validation rules**

Data validation is defined in a window with 3 tabs: Settings, Input Message, and Error Alert:

The settings tab is where you enter validation criteria. There are a number of built-in validation rules with various options, or you can select Custom, and use your own formula to validate input as seen below:

The Input Message tab defines a message to display when a cell with validation rules is selected. This Input Message is completely optional. If no input message is set, no message appears when a user selects a cell with data validation applied. The input message has no effect on what the user can enter — it simply displays a message to let the user know what is allowed or expected.

The Error Alert Tab controls how validation is enforced. For example, when style is set to "Stop", invalid data triggers a window with a message, and the input is not allowed.

The user sees a message like this:

When style is set to Information or Warning, a different icon is displayed with a custom message, but the user can ignore the message and enter values that don't pass validation. The table below summarizes behavior for each error alert option.

| **Alert Style** | **Behavior** |
| --- | --- |
| Stop | Stops users from entering invalid data in a cell. Users can retry, but must enter a value that passes data validation. The Stop alert window has two options: Retry and Cancel. |
| Warning | Warns users that data is invalid. The warning does nothing to stop invalid data. The Warning alert window has three options: Yes (to accept invalid data), No (to edit invalid data) and Cancel (to remove the invalid data). |
| Information | Informs users that data is invalid. This message does nothing to stop invalid data. The Information alert window has 2 options: OK to accept invalid data, and Cancel to remove it. |

**Data validation options**

When a data validation rule is created, there are eight options available to validate user input:

**Any Value** - no validation is performed. Note: if data validation was previously applied with a set Input Message, the message will still display when the cell is selected, even when Any Value is selected.

**Whole Number**- only whole numbers are allowed. Once the whole number option is selected, other options become available to further limit input. For example, you can require a whole number between 1 and 10.

**Decimal** - works like the whole number option, but allows decimal values. For example, with the Decimal option configured to allow values between 0 and 3, values like .5, 2.5, and 3.1 are all allowed.

**List** - only values from a predefined list are allowed. The values are presented to the user as a dropdown menu control. Allowed values can be hardcoded directly into the Settings tab, or specified as a range on the worksheet.

**Date** - only dates are allowed. For example, you can require a date between January 1, 2018 and December 31 2021, or a date after June 1, 2018.

**Time** - only times are allowed. For example, you can require a time between 9:00 AM and 5:00 PM, or only allow times after 12:00 PM.

**Text length** - validates input based on number of characters or  digits. For example, you could require code that contains 5 digits.

**Custom** - validates user input using a custom formula. In other words, you can write your own formula to validate input. Custom formulas greatly extend the options for data validation. For example, you could use a formula to ensure a value is uppercase, a value contains "xyz", or a date is a weekday in the next 45 days.

The settings tab also includes two checkboxes:

**Ignore blank** - tells Excel to not validate cells that contain no value. In practice, this setting seems to affect only the command "circle invalid data". When enabled, blank cells are not circled even if they fail validation.

**Apply these changes to other cells with the same settings** - this setting will update validation applied to other cells when it matches the (original) validation of the cell(s) being edited.

*Note: You can also manually select all cells with data validation applied using Go To + Special, as explained below.*

**Simple drop down menu**

You can provide a dropdown menu of options by hardcoding values into the settings box, or selecting a range on the worksheet. For example, to restrict entries to the actions "BUY", "HOLD", or "SELL" you can enter these values separated with commas as seen below:

When applied to a cell in the worksheet, the dropdown menu works like this:

Another way to supply values to a dropdown menu is to use a worksheet reference. For example, with sizes (i.e. small, medium, etc.) in the range F3:F6, you can supply this range directly inside the data validation settings window:

Note the range is entered as an [absolute address](https://exceljet.net/glossary/absolute-reference) to prevent it from changing as the data validation is applied to other cells.

*Tip: Click the small arrow icon at the far right of the source field to make a selection directly on the worksheet so you don't have to enter the range manually.*

You can also use [named ranges](https://exceljet.net/glossary/named-range) to specify values. For example, with the named range called "sizes" for F3:F7, you can enter the name directly in the window, starting with an equal sign: