Lesson 7 Using Functions and Formulas and Password Protection

Formulas are used to perform calculations in a worksheet. All formulas must begin with an equal sign (=). Formulas can consist of the following elements:-

. Constant values (such as 5 or 100)

. Cell references (such as A1 or A1:A3)

. Operators (such as + for addition or * for multiplication).

. Functions (such as SUM or AVERAGE).

Using Operators in Formulas

Operators are symbols that represent specific mathematical operations. Excel formulas support a variety of operations (see table below). Arithmetic operators perform basic mathematical operations (such as addition or subtraction) and return numerals results. *Corporation operators* compare two values and return **TRUE** or **FALSE**.

Table 3 – Arithmetic and Comparison Operators

Operator	Description	Example	Result
+	Addition	=1+1	2
-	Subtraction	=1-1	0
*	Multiplication	=2*2	4
/	Division	=4/2	2
%	Percentage	=20%	0.2
^	Exponentiation	=2^3	8
=	Equal to	=1=2	FALSE
>	Greater than	=1>2	FALSE
<	Less than	=1<2	TRUE
>=	Greater than or equal to	=1>=1	TRUE
<=	Less than or equal to	=1<=1	TRUE
<>	Not equal to	=1<>1	FALSE

When a formula contains more than one operator, Excel performs calculation from left to right based on the standard mathematical order of operation. You can change this order by using parentheses: calculations within parenthesis are performed first. The basic order of operations is as follows:

1. Percentage
2. Exponentiation
3. Multiplication and division
4. Addition and subtraction
5. Comparison.

Using Cell References in Formulas

Most formulas are created using cell references. A cell reference identifies a cell or a range of cells is a worksheet. There are three types of cell references in **Excel**, *relative, absolute, and mixed.* (T.able 4 below)These references below behave differently when a formula is copied to other cells.

You can create an absolute reference by adding a dollar sign before the column key letter and row number **e.g. A1**. If the dollar sign precedes only the column letter, **e.g. $A1**, the column is absolute and the row is relative. if the dollar sign precedes only the row number, **e.g. A$1**, the column is relative and the row is absolute.

Table 4 – Types of Cell References

| Reference Type	Description	Example
Relative	Refers to cells by their position in relation to the cell that contains the formula (such as "the cell two rows above this cell"). When you copy a formula containing relative references, the references adjust to the new location.	A1
Absolute	Refers to cells by their fixed position in the worksheet (such as "the cell located at the intersection of column A and row 1"). Absolute references always refer to the same cell, regardless of where the formula is copied.	A1
Mixed	Contain both relative and absolute references (such as "the cell located in column A and two rows above this cell"). When you copy a formula containing mixed references, the relative references adjust, but the absolute references do not.	$A1 or A$1

Entering Formulas

You can create a simple formula by entering constant values or using cell references. The advantage of using sell references in a formula is that the formula automatically recalculates wheneverthe value in any cell is referenced in the formula changes.
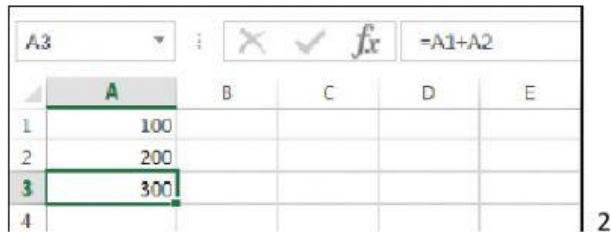
To enter a formula

1. Select the cell in which you want to enter the formula.
2. Type an equal sign (=).
3. Enter the first value or cell reference.

   NOTE: Too avoid typing mistakes, you can click a cell to insert its cell reference in a formula, rather than typing its address.
4. Enter the desired operator.
5. Enter the next value or cell reference.
6. Repeat steps 4 and 5 as needed to complete the formula .1

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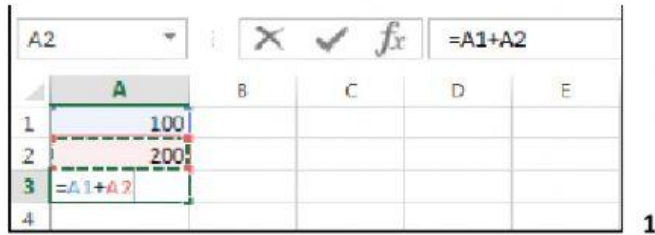
7. When finished, press the **Enter** key. The result of the formula appears in the cell . **2**

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Displaying Formulas

Cells containing formulas display the results of the formula, not the formula itself. You can see the underlying formulas by selecting individual cells and looking at the Formula bar. Another way to see formulas in a workbook is to make them all visible.

To display all formulas

1. On the **Formula** tab, in the **Formula Auditing** group, the **Show Formulas** button **(3)** ,. The width of each column increases to accommodate the formulas:
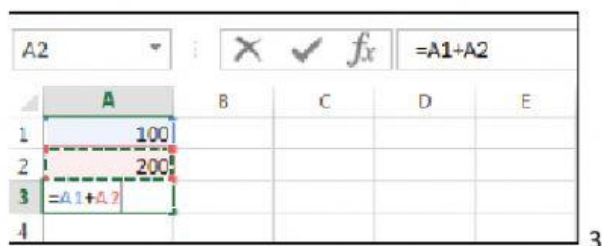
   NOTE: To hide the formulas and redisplay the calculated results, click the Show Formulas button again.

To enter a formula

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2. Type an equal sign **(=)**
3. Enter the first value or cell reference.

   NOTE: To avoid typing mistakes, you can click a cell to insert its cell reference in a formula, rather than typing its address..

4. Enter the desired operation.
5. Enter the next value or cell reference.
6. Repeat **steps 4 and 5** as needed to complete the formula. **3**

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7. When finished press the **Enter** key. The result of the formula appears in the cell **4.**

4
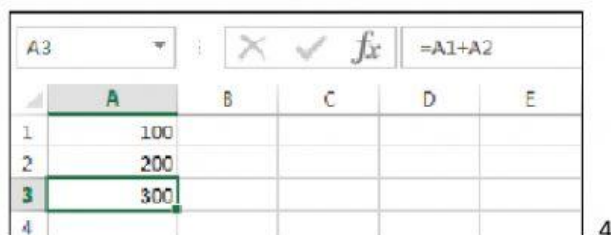
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Using Functions in Formulas

Functions are predefined formulas that can be used to perform complex calculations. Excel includes hundreds of functions that youy can use alone or in combination with other formulas or functions . **Table 5**

Table 5 – Commonly Used Excel Functions

Function	Description	Example
SUM	Adds the values in the selected range.	=SUM(A1:A5)
AVERAGE	Averages the values in the selected range.	=AVERAGE(A1:A5)
COUNT	Returns the number of cells containing numbers.	=COUNT(A1:A5)
MAX	Returns the largest value in the selected range.	=MAX(A1:A5)
MIN	Returns the smallest value in the selected range.	=MIN(A1:A5)

Each function has its own *syntax* which specifies how it must be written. The general syntax of a function is an equal sign (=), followed by the function name, an opening parenthesis, the function arguments, and a closing parenthesis. *Function names* (such as SUM and AVERAGE) describe the operation the function performs. *Arguments* specify the values or cell references the function uses when it performs its operations. Some functions have no arguments or the argument is optional.

There are a few rules to keep in mind when using functions:
- Arguments must be entered in the order required by the function.
- Arguments must be separated by commas.
- Optional arguments must be placed after the required ones.
- Parentheses are needed with every function, including functions that have no arguments.

Using AutoSum Button.

The AutoSum button provides quick access to the most commonly used function (SUM, AVERAGE,COUNT,MAX, and MIN). It appears on both the *Home tab and the Formula tab* of the Ribbon. The default action of the AutoSum button is the SUM function; you can access the other functions by clicking the arrow on the button.


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To sum numbers using the AutoSum button

1. Select a cell next to the numbers that you want to sum.
2. On the **Home** tab, in the **Editing** group, click the **AutoSum** button, **7.** *Excel* automatically enters a formula that uses the **SUM** function and suggests a range to sum **8.**

3. Do one of the following:
   . If the suggested range is correct press the **Enter** key, to display the result.
   . If the suggested range is incorrect, select the correct range, and then press the **Enter** key, to display the results.

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8
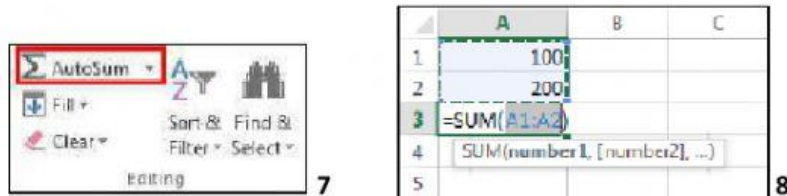
Inserting Functions

Functions are organized into categories. (Financial, Logical, Text, Date & Time, Lookup & Reference ,Math & Trig, etc), based on their purpose (9). Each of the categories has a button in the **Function Library** group on the formulas tab of the **Ribbon**. You can insert a function into formulas by selecting it from one of the functions categories. If you care not sure which category to choose, you can use the *Insert Function* dialog box, to browse through the entire list of functions and select the one you need. 9


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Password- protecting Workbooks.

In Excel you can protect a workbook with a password, allowing only authorised users to open

the file. This can be used to protect files stored on computers or external storage devices, as well as data being transferred via networks.

To password-protect a workbook.

1. Open the workbook that you want to protect.
2. Click the **File** tab, and then click **Info**. The Info page of the **Backstage view** opens.

3. In the centre pane, click the **Protect Workbook** button, and then click **Encrypt** with **Password** .

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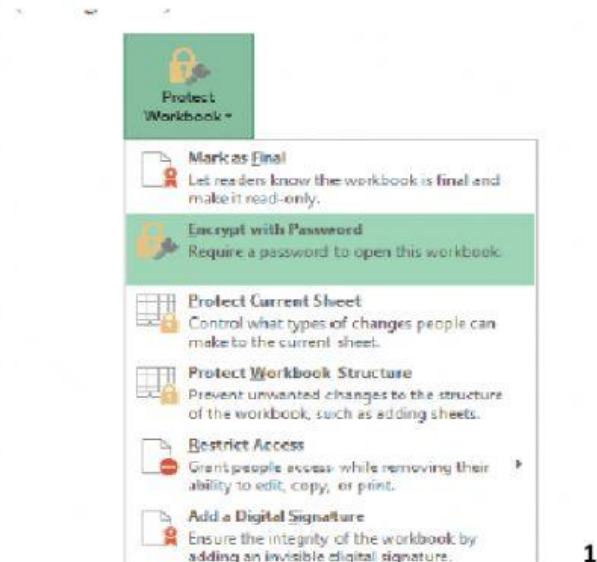
4. In the **Encrypt** document dialog box, type a password in the **Password** box, and then click the **OK** button. **2**

    NOTE: Passwords are case-sensitive. Lost or forgotten passwords cannot be recovered.

2

5. In the **Confirm** Password dialog box, retype the password in the **Re-enter Password** box, and then click the **OK** button. **3**

Confirm Password

Encrypt the contents of this file

Reenter password:

Caution: If you lose or forget the password, it cannot be recovered. It is advisable to keep a list of passwords and their corresponding document names in a safe place.
(Remember that passwords are case-sensitive.)

OK   Cancel

3

6. Save the workbook.

NOTE: If you want to remove the password from the workbook, click the **File** tab to display the **Info** page, click the **Protect Workbook** button, and then click **Encrypt with Password**. In the **Encrypt Document** dialog box, delete the password from the **Password** box, and then click the **OK** button.

Questions

1. **What are the four formulas elements that can be used ?**

2. **What are the 5 basic order of operations ?**

3. **Explain Relative absolute and mixed ?**

4. Explain the steps for password protection?