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Excel Essentials

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What is a Spreadsheet?



A spreadsheet is the computer equivalent of a paper ledger sheet.

<i>paper ledger</i>	
<i>car loan</i>	<i>\$12,000</i>
<i>interest</i>	<i>9.6%</i>
<i># of payments</i>	<i>60</i>
<i>monthly payment</i>	<i>\$252.61</i>

	A	B	C
1		computer ledger	
2			
3		car loan	\$12,000.00
4		interest	9.60%
5		# of payments	60
6			
7		Monthly Pmt.	\$252.61






Worksheet – new name for Spreadsheet



Workbook – one file containing multiple worksheets. Suffix is .xls for Excel 2003 and .xlsx for Excel 2007 and beyond.



Common Spreadsheet Applications

-  Financial tracking and analysis
-  Database (mailing list, membership list, etc.)
-  Scientific and engineering calculations





Worksheet terminology

Columns Labels Values

Rows

	A	B	C	D	E
1	Expense(in\$)	Jan	Feb	Mar	Total
2	Mortgage	900	900	900	2700
3	Telephone	120	90	110	320
4	Gas	220	220	180	620
5	Insurance	60	60	60	180
6	Total	1300	1280	1250	3830

Cells

There are over 16 million cells per worksheet!

Columns: A – Z then AA, AB, etc

Rows: 1 - ?

An individual cell can hold up to 65,000 characters!



Cell Address

	A	B	C	D
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				

**Cell
C6**



Cell Data

Data type	Examples	Description
LABEL	Name or Wage or Days	Anything that is just text
NUMBER or VALUE or CONSTANT	5 or 3.75 or -7.4	any number
FORMULA	=b3+c3 or =c8*b5+a3	math calculation

Cells may also contain comments and formatting info



Components of the Excel window

Quick Access Toolbar

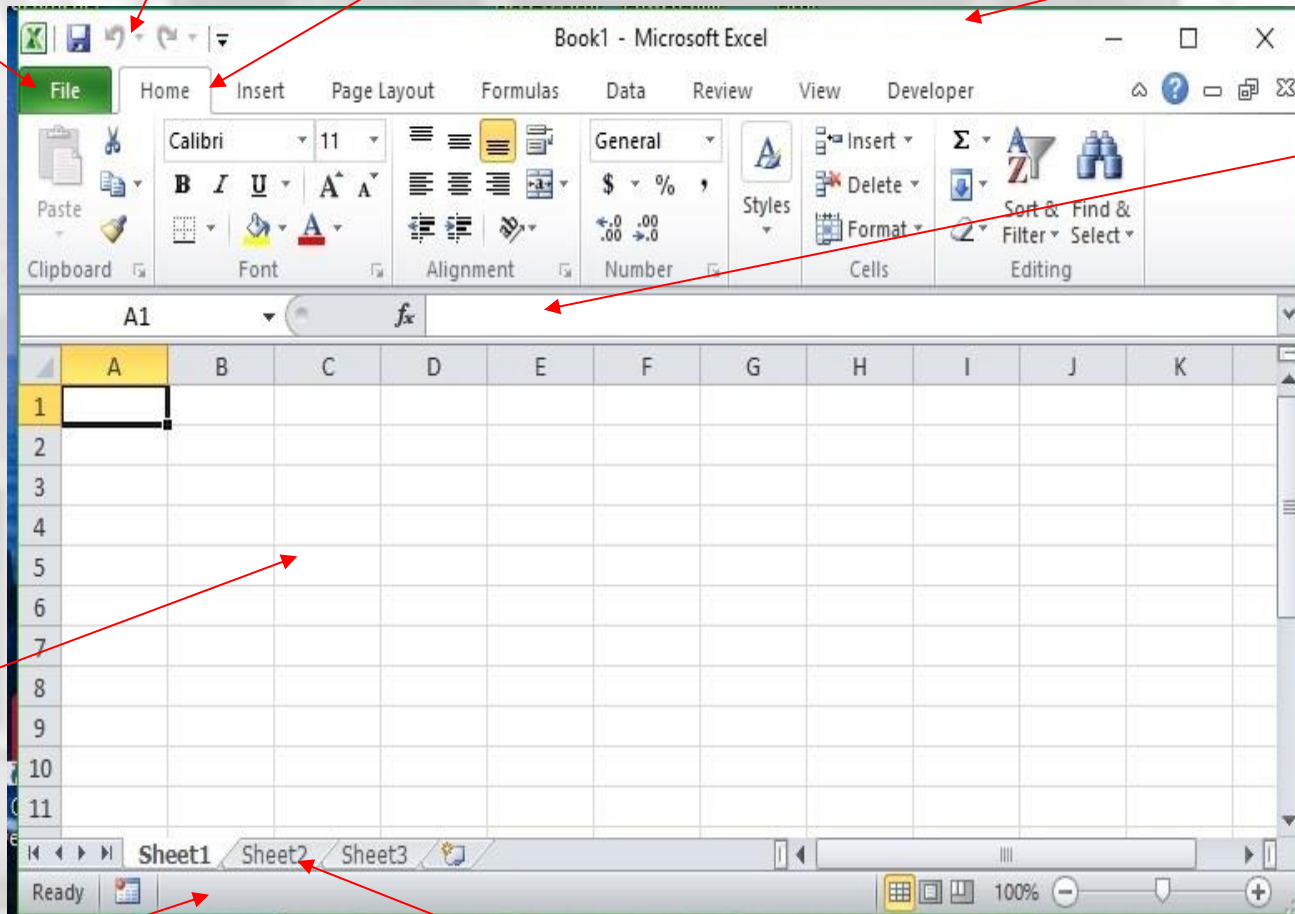
File Menu

Context Tabs

Title bar

Ribbon

Formula bar



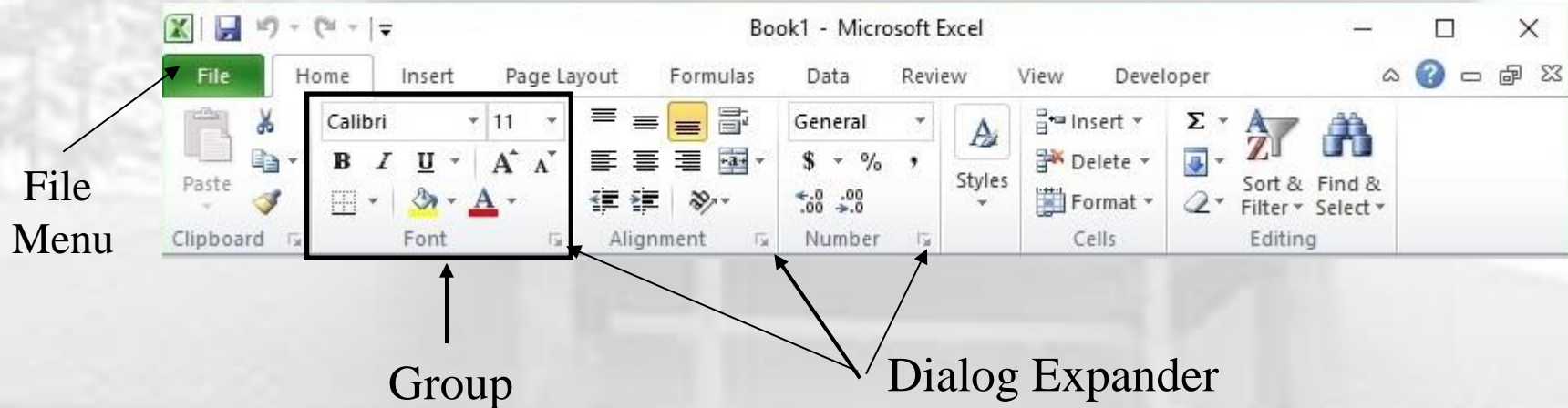
Active worksheet

Status bar

3 spreadsheets in workbook



Excel Ribbon



Ribbon commands are divided into 7 or more tabs



Each tab contains a series of groups



Each group has a series of related controls










Dialog Expander opens a related dialog box



File menu also contains commands

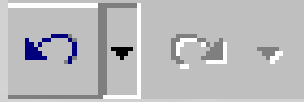


File Menu

-  **New** – open a new spreadsheet file
-  **Open** an existing spreadsheet file
-  **Recent** – open a spreadsheet that you have been using recently
-  **Save As** – new file name and/or location
-  **Save** an updated spreadsheet file
-  **Print** a spreadsheet (all or part)
-  **Close** the spreadsheet



Buttons: Undo and Redo



The Undo button lets you reverse an action you just performed.



Redo lets you change your mind and do that action all over again.



Excel keeps track of only the last 16 actions.



Formula Bar



Shows the contents of a selected cell, whether it is plain text, numbers, or a calculation formula.



The **Name Box** shows the **cell reference** or the **name** of the active cell. For a range, only the upper left cell reference is shown.

The screenshot shows an Excel spreadsheet interface with several components labeled with yellow boxes and red arrows:

- Name Box:** Located at the top left, it displays "B3".
- Formula Bar:** Located below the Name Box, it displays "This is cell B3".
- Column Headings:** The top row of the grid, labeled A, B, C, and D.
- Row Headings:** The leftmost column of the grid, labeled 1, 2, 3, and 4.
- Active Cell:** The cell at the intersection of row 3 and column B, which contains the text "This is cell B3".
- Gridlines:** The thin lines that separate the cells in the spreadsheet grid.



Formula Bar Buttons

The buttons on the formula bar act on the selected cell, which has its contents displayed in the box to the right of these buttons. These buttons are enabled only when you are entering data into a cell.



The **red X** cancels your changes if you haven't entered the data yet. Pressing the ESC key does the same thing. If you have already entered the data into the cell, you can use the Undo command to reverse what you did.



The **green check mark** enters what you typed into the cell and leaves the cell selected. Pressing the ENTER key also makes the cell accept what you typed, but then it changes the selection to the cell below, by default.



Object / Action



One of the basic principles of the Graphical User Interface is “object / action.” Select the object of interest and then choose the action to be taken on that object.



In Excel, select the object (cells, row, column, text, etc.) and then right-click with the cursor over the object to bring up the shortcut menu listing the available actions.



Left-click on the desired action.



Shortcut menu (Example)



Appears when you right-click an object or screen element



Provides a short list of commands related to the screen element or object to which you're pointing



Contains Cut, Copy and Paste commands, among others





Selecting Cells and Ranges



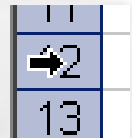
To select a:



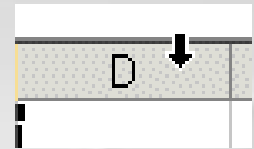
Single Cell – click on the cell



Single Row – click on the row number



Single Column – click on the column letter



To de-select:



Select something else



Selecting multiple Cells, Rows, Columns



Contiguous cells



Use the mouse and drag across cells

OR



Click the upper-left cell, press and hold
SHIFT, click the lower-right cell



Non-contiguous cells



Click the 1st cell



Press and hold CTRL






Click the remaining cells







Cell operations

-  You **enter data** when you type text or numbers or formulas into a cell. If a cell already has data, your typing overwrites the existing data.
-  You **edit data** when you make changes to existing data in a cell.
-  You **clear data** when the cell's contents are erased, but the cell itself is not deleted.



Data Types







 Labels can be letters and numbers or (‘) as first char before numbers (e.g., ‘2004)

 Numbers begin with a digit or +, -, ., \$

 Formulas begin with an =





Entering Data

-  Select cell and type directly into the cell
OR
-  Select cell and then Click in Formula Bar to type the data in the Formula bar
-  Complete typing using Enter key or other navigation key (Tab, Arrow, etc.) or 
-  Cancel typing using Esc or 





Editing Data

Editing options

 Double-click cell and make changes directly in the cell. Press Enter key or click on green checkmark. 

OR

 Select cell to be edited and make corrections in the Formula Bar. Press Enter key or click on green checkmark. 



Clearing Cells



Clearing options




Select cell(s) to be cleared



Press **Delete** key

OR





On the Home tab , in the Editing group, click on the arrow next to the Clear button,  and then select Clear Contents



The data in the cell is erased. Any formatting will remain and will be applied to new data that you enter later



Moving data in worksheets



1. Select the cell(s) you want to move
2. Right-click and select **Cut**, or click  , or press Ctrl+X
3. Select the destination cell(s) for the data
4. Right-click and select **Paste**, or click  , or press Ctrl+V

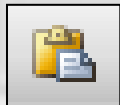


Home tab, Clipboard group



Copying data in worksheets

1. Select the cell(s) you want to copy
2. Right-click and select **Copy**, or click  , or press Ctrl+C
3. Select the cell(s) you want to copy the data to
4. Right-click and select **Paste**, or click  , or press Ctrl+V



Home tab, Clipboard group



Copying using the Fill handle

Fill handle is the small black square in the lower-right corner of the selection. When you point to the fill handle, the pointer changes to a black cross $+$



Fill handle

1. Select the cell(s)
2. Point to the fill handle; look for black cross
3. Drag the fill handle over the adjacent cells into which you want to copy the data





Example worksheet

The screenshot shows a Microsoft Excel window titled "Textbooks 2.xls [Compatibility Mode] - Microsoft Excel". The ribbon is set to "Home". The active cell is A1. The worksheet contains a table with the following data:

	A	B	C	D	E	F	G	H	I
1									
2			Textbook Order						
3									
4		Textbook	Quantity	Price	Extension				
5									
6		Biology	4	\$99.99	\$399.96				
7		Chemistry	2	\$79.95	\$159.90				
8		Calculus	7	\$65.99	\$461.93				
9		English	12	\$49.99	\$599.88				
10									
11				Subtotal	\$1,621.67				
12			6%	Sales tax	\$97.30				
13				Total	\$1,718.97				
14									





Formatting

You can format cell(s), row(s) & columns(s)

- Select the object(s) to be formatted
- Apply the format action from the **Font**, **Alignment** or **Number** group
- Additional actions available using the **Dialog Expander**
- You can also right-click over selection and pick **Format Cells** from the menu



Formatting (Con't)

Some additional formatting options

- Adjust column width and row height
- **Wrap text** within a cell
- **Merge & Center** – center data across a range of cells
- Copy formatting using the **Format Painter** in the Clipboard group



Formatting (Con't)

Adjust column width

- Drag right border in column header
- Double click right border for automatic column width adjustment
- Right click in column header and select Column Width from menu

Adjust row height – height is adjusted automatically in most cases. Can also drag border



Formatting (Con't)

Merge & Center

- Select the range including the data to be centered
- Click Merge & Center in the Alignment group

“Unmerge” using the Unmerge option in the Merge & Center dropdown





Formulas in Excel



In Excel, we use formulas to perform calculations. For example,



Calculate totals and averages



Calculate percentage increase or decrease



Calculate sales tax or sales commission



Calculate interest to be earned






Calculate annuity payments



Calculate various scientific and engineering values



Formulas in Excel

-  Formulas are cell entries that have a mathematical statement which calculates the value to display.
-  We enter the formula into the cell; Excel calculates the result and displays the value in the cell.
-  This displayed result will be updated upon the change or entry of any data that is referenced in the equation.

	A	B	C
1		computer ledger	
2			
3		car loan	\$12,000.00
4		interest	9.60%
5		# of payments	60
6			
7		Monthly Pmt.	\$252.61



Formula Operations



The basic operations and their symbols are:

add + subtract - multiply * divide / power ^



Formulas follow the rules of algebra. Numbers can be positive or negative. There is a defined order of operations.



Formulas generally contain references to other cells in the spreadsheet. Formulas can also contain constants; for example, 10% or 3.14159



Order of operations


$$12 + 4 / 2 = ?$$

$$(12 + 4) / 2 = 8$$

$$12 + (4 / 2) = 14$$



Order of operations

 When the formula involves several operations, Excel has to know in what order to do them. For example, in $12 + 4 / 2$ Excel will divide first and then add 12, which results in an answer of 14. This is not the same as $(12 + 4) / 2$ where Excel will add first (because of the parentheses) and then divide, resulting in an answer of 8.

The order of operations is: Please Excuse My Dear Aunt Sally

Any calculations inside Parentheses ()

Negation -

Percentage %

Exponents ^

Multiply and Divide * /

Add and Subtract + -



Formula Examples

The equal sign is **required**.

=B3 * C14 Multiply the value in cell B3 by the value in C14

=D12 - B3 Subtract the value in cell B3 from the value in D12

=(A10 + B5) / C4 Add the values in cells A10 and B5 and then divide by the value in C4

=C7 + (C7 * 10%) Compute a 10 percent increase in the value contained in cell C7



Entering formulas

1. Select the cell where you want the result to appear
2. Type the formula beginning with = sign. Cell references can be lower case.

	A	B	C
1			
2	45		
3	66		
4	111		
5			

The image shows a spreadsheet interface. The active cell is A4, which contains the value 111. The Formula Bar above the spreadsheet shows the formula =A2+A3. The spreadsheet grid has columns A, B, and C, and rows 1 through 5. Cell A2 contains 45 and cell A3 contains 66.

The result is displayed in the cell. The formula is shown in the Formula Bar.



Entering Cell References Using the Mouse

1. Select the cell to enter the formula
2. Type =
3. Click the cell for which you want to enter a reference; e.g. A1, B2, C3.
4. Type an operator (+, -, *, /, ^)
5. Repeat steps 3 and 4 until you've created the formula you want
6. Press Enter





Moving & Copying Formulas



Formulas contain cell references, values, operators, and functions



Formulas can be moved or copied in the same way that you move or copy any other cell data



Excel **does not** change formulas that are **moved** (same calculation, but in a new location)



Excel **may** change formulas as they are **copied** into new cells (calculation changed to suit the new location)



Copying using the Fill handle

Fill handle is the small black square in the lower-right corner of the selection. When you point to the fill handle, the pointer changes to a black cross $+$



Fill handle

1. Select the cell
2. Point to the fill handle; look for black cross
3. Drag the fill handle over the adjacent cells into which you want to copy the data





Create a Chart

- Select the data to appear on the chart
- Go to the **Insert** tab on the ribbon
- In the **Charts** group, select the type of chart to be created
- Use the **Chart Tools** to edit chart features





Limitations of relative references



We don't always want Excel to modify cell references in a formula when it is copied.



If we do NOT want Excel to change a cell reference when a formula is copied, we use an “absolute” cell reference in the formula.



Absolute references



Absolute cell references are not changed when formulas are copied



Absolute cell references are created by placing dollar signs in front of the column letter and row number. For example: $\$B\3 is an absolute reference to the cell in the second column of the third row on a given worksheet. This reference will always point to that cell, even if the formula containing the reference is copied or moved to another cell.



Examples:




$\$C\12 , $\$A\1 , $\$C\2





Mixed references

 Contain relative and absolute references

 Creating mixed references:

 Place a dollar sign in front of only the column letter or the row number e.g. \$C12, C\$12

 Relative reference changes when you copy the formula; absolute reference does not

 \$B3 is a mixed reference: B is absolute, 3 is relative. It will always point to the same column when the formula it is in is moved or copied to another cell, but the row will update.



Tip



To cycle between relative, absolute, and mixed cell references, place the insertion point within a cell reference in the formula bar (not in front of the equal sign) and then press the F4 key repeatedly until you get the reference format you require. The **4 possibilities are:**

- relative cell reference **E5**
- absolute cell reference **\$E\$5**
- mixed reference with column absolute **\$E5**
- mixed reference with row absolute **E\$5**



Inserting entire rows or columns

1. Select the row or column where you want to insert a new row or column
2. Right-click the selection to display the shortcut menu and click Insert

OR

Home | Cells | Insert | Insert Sheet Rows or Columns

You can select multiple rows/columns and the Insert will add a corresponding number of new rows/columns



Deleting rows & columns

1. Select the row(s) or column(s)
2. Right-click and choose Delete from the shortcut menu

OR

Home | Cells | Delete | Delete Sheet Rows or Columns





Fill handle - Repetitive or Sequential data



Repetitive Data



Select the cell which contains data or formula to be copied



Use the Fill handle to drag across adjacent cells



Sequential Data



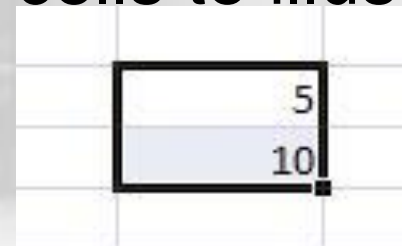
Enter data in two adjacent cells to illustrate the desired sequence



Select both cells



Use the Fill handle to drag across adjacent cells



A screenshot of a spreadsheet grid. Two adjacent cells are highlighted with a blue background. The top cell contains the number '5' and the bottom cell contains the number '10'. A small black square (the fill handle) is visible in the bottom-right corner of the selected cells.



Fill Handle – Repetitive or Sequential data



Sequential data Exceptions – select a single cell containing the starting value, then drag



Days of the Week, Months of the Year



Dates



You can alter Fill handle behavior by holding down the CTRL key during the drag operation



Excel Formulas Example

Bill Jones, age 45, invested \$10,000 in a Mutual fund that averages 8% appreciation per year. He plans to add an \$500 at the end of each year. Create a spreadsheet that shows the projected year by year growth of his investment until his retirement at age 65. For each year, show his age, the beginning balance and the ending balance.



Excel Formulas Example

Bill Jones Investment Display.xls [Compatibility Mode]

	A	B	C	D	E	F	G	H	I	J	K	L
1												
2				Bill Jones Investment								
3												
4			Beginning				Ending					
5	Year	Age	Balance	Rate	Growth	Deposit	Balance					
6												
7	2016	45	\$10,000	8%		\$500						
8	2017											
9												
10												
11												
12												
13												
14												
15												
16												
17												

Formula to compute Ending Balance

Formula to compute Growth

Formula - start of year 2 equals end of year 1