

Spreadsheets - Microsoft Excel 2010

Handbook

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PREFACE

Today's society is shaped by sudden growth and development of the information technology (IT) resulting with its great dependency on the knowledge and competence of individuals from the IT area. Although this dependency is growing day by day, the human right to education and information is not extended to the IT area. Problems that are affecting society as a whole are emerging, creating gaps and distancing people from the main reason and motivation for advancement-opportunity. Being a computer illiterate person today means being a person who is unable to participate in modern society, and a person without opportunity; and despite the acknowledged necessity and benefits of inclusive computer literacy from institutions like the European Commission, UNESCO, OECD, there are still groups of people having difficulties accessing basic computer education viz. persons with disabilities, persons with learning difficulties, migrant workers, unemployed persons, persons that live in remote (rural) areas where IT education is not accessible.

This handbook, combined with other materials published on ITdesk.info, represent our effort and contribution to the realization and promotion of human rights to education and information considering the IT area. We hope that this education will help you in mastering basic computer skills and with that hope we wish you to learn as much as you can, and therefore become an active member of modern ICT society.

Sincerely yours,

ITdesk.info team



Expert review of Croatian version:

infokatedra
Centar za obrazovanje



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MICROSOFT EXCEL 2010 APPLICATION

INTERFACE ELEMENTS

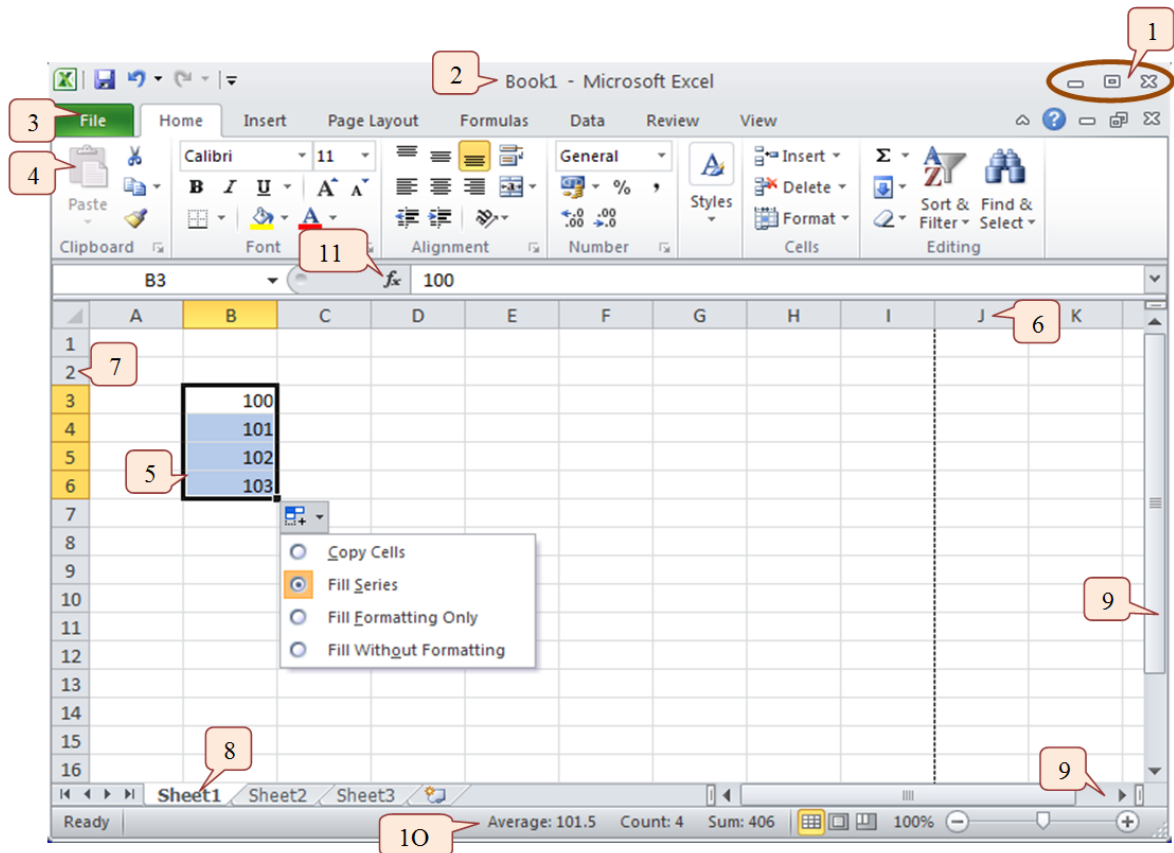
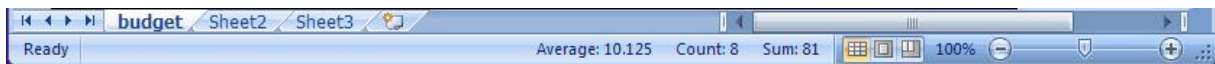


Fig.1. Interface elements

1. Buttons for manipulation of the window are used to maximize, minimize or close it.
2. Title bar of the document contains information on the document name and the application in which it was created.
3. Tabs:
 - File** - used to perform basic operations on the document (save it, open an existing document, create a new document etc.)
 - Home** - includes content formatting tools
 - Insert** - used to insert various objects in a document
 - Page Layout** - used to edit page layout (setting margins, size, color, orientation, borders etc.)
 - Formulas** - contains tools for data entry and processing functions
 - Data** - contains tools for data importing, sorting, filtering etc.
 - Review** - used to control document spelling, translate words to other languages, insert comments, protect and share workbook etc.
 - View** - used to determine window appearance (by selecting different views, zoom etc.)

4. Toolbar - contains all the tools required to work in the application.
 - some commands are hidden and have an arrow next to the tool for opening additional options
 - commands colored in grey cannot be currently performed
 - commands with three dots contain a sequence of further orders
5. Cells – fields for entering the data and performing various operations on them
6. Column headings (letters)
7. Row headings (numbers)
8. Worksheets
9. Bars for horizontal and vertical navigation (sliders)
 - click on a double arrow up / down to shift the view by one page more / less
10. Status bar - displays information about the current state of the program, such as status of items in the window, the flow of the task currently being executed or information about the selected item



11. Formula Bar

BASIC OPERATIONS WITH SPREADSHEETS

Column headings are labeled with letters, rows with numbers.

Worksheet consists of columns and rows, and its basic unit is a **cell**. Each cell has its coordinates (address), which is expressed with the column letter and the row number. A cell is selected by positioning the cursor over it and clicking.

If we want to select several cells, click with the left mouse button on the first one, press and hold down the mouse button and drag it until the desired cell range is selected.

Use bars for horizontal and vertical navigation (**sliders**) to reach the desired location within a document.

Status bar displays the status of some specific software functions. They can be adjusted according to user's needs.


Name box shows the current location where the cursor (mouse pointer) is positioned.

Use the **formula bar** to enter functions, or enter formulas directly into a cell.

Launching the application:

Click on the **Start** menu, then click the **All Programs** menu and then the **Microsoft Office** folder. From Microsoft's office suite choose the **Microsoft Excel 2010** application to open a new workbook.



It can also be launched via the shortcut , usually found on the computer desktop or by using the **Search** function. Enter the word “excel” in the search field and press enter, and from the offered search results, choose Microsoft Excel 2010.

Closing the application

Application can be closed by selecting the **Close** button (window manipulation button on the right side of the Title bar), using the **Exit** command on the **File** menu, or by using the key combination **Alt + F4**.

If the document is not saved, you will get a **DisplayAlert** asking you to decide whether to save the file with new changes, disregard changes, or cancel exiting the file.

Opening workbooks

Previously saved workbooks can be opened by using the **Open** command, found on the **File** menu. When a dialog box appears, select the workbook you want to open and click the **Open** button. To open previously saved workbooks, the dialog box can also be invoked by the keyboard shortcut **Ctrl + O**. To open multiple workbooks at once, it is necessary to select all the workbooks we want to open in the dialog box (hold down the **Shift** key if the files are listed in a sequence, or the **Ctrl** key if they are not), and then click the **Open** button.

Closing workbooks

Workbook can be closed in several ways:

- **Close** button on the right side of Title bar,
- in the **File** menu, select the **Close** command, or
- keyboard shortcut **CTRL + W**

Create a new workbook based on a default template

From the **File** menu select **New** command. If you want to create a new empty workbook, choose the **Blank Workbook**. It opens a new workbook with three worksheets.

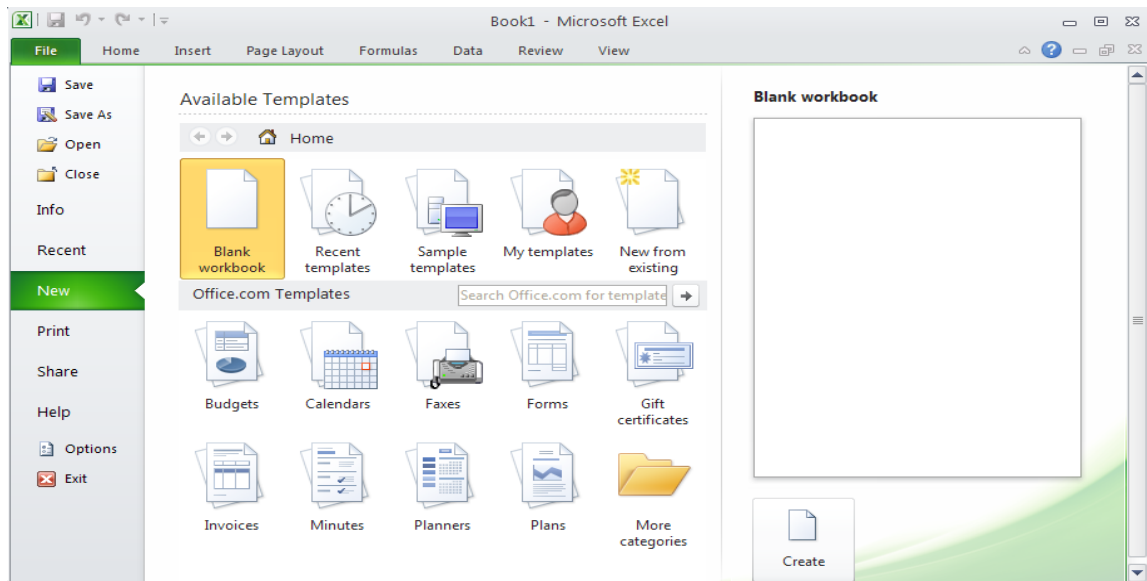



Fig.2. New command

Also, from the **File** menu, select the **New** command, and in the left column, select the **Sample templates** option and select one of the offered templates. New templates can be viewed on Microsoft Office online and stored on a computer.

Save the workbook to a location on your hard disk under the same or another name

Workbook can be saved by clicking on the **Save** command in the **File** menu. Saving can be also done by using the key combination **Ctrl + S** or by clicking the icon in the shape of a disc on the **Quick Access Toolbar** .

To save it under a different name, select the **Save as** command in the **File** menu. When the **Save As** dialog box appears, a new file name must be entered in the **File Name** field. For each subsequent save, simply use the **Save** button located on the **Quick Access Toolbar** or the keyboard shortcut **Ctrl + S**.

Save a workbook in another file format


If we want to save a workbook as a different file type, choose the **Save As** command from the **File** menu. When the **Save As** dialog box appears, click on the drop-down menu within the **Save as type** field and select the desired type. If you want to create a template, choose the **Excel Template (*.xltx)** option. To save the workbook in the form compatible with older versions of Microsoft Excel application, choose the **Excel 97-2003 Workbook (*.xls)** option.


Switching between open workbooks:

- positioning the mouse over the application icon on the **taskbar** shows a preview of an opened file, and by clicking on the thumbnail, we move from one window to another,
- key combination **Alt + Tab**,
- on the **View** tab, choose the **Switch Windows** tool.

To change username, open the **File** menu, and click on the **Options** button. By clicking the **Options**, the **General** tab is opened. The **User name** field is located at the bottom of the tab.

If we want to change the primary folder for saving and opening workbooks, choose the **Save** tab. Choose the desired folder location in the **Default File Location** field. The folder you choose will be offered the next time you proceed to save (Save As).

Help function is located on the **File** menu, or you can click on the icon  located under the title bar buttons. On the right side of the window, there are information on the application version we are using. By selecting the **Microsoft Office Help** option, a window, with the available list of help topics, opens. In the **Search** text box, enter the term you want to explore. The quickest way of calling Help function is using the **F1** key on the keyboard.

Open the **Zoom** dialog box by clicking on the **Zoom** tool  found on the **View** menu. You can choose among the proposed zoom values or enter your own value, which must be an integral number in the range of 10 to 400. The **Zoom** dialog box also opens by using the **Zoom** button in the right corner of the Status bar.

We can also use the **Zoom Slider**  to zoom, or the mouse wheel and the **Ctrl** key.

Adjusting Ribbon

Ribbon is configured through the **File** menu. Click on the **Options** button and select the **Customize Ribbon** tab. If you do not want to run some of the default menus, simply remove the tick next to them. A possibility of creating our own menu is also available, and it can be adjusted to fully meet our requirements. Select the desired tool on the left side of the dialog box and click on the **Add** button to add it to the menu. If you want to remove the tool from the menu, select it and click on the **Remove** button.

Setting Quick Access Toolbar

Quick Access Toolbar is used for quick access to frequently used tools.

1. In the **File** menu, click on the **Options** button and select the **Quick Access Toolbar**, or
2. Click on the arrow next to the **Quick Access Toolbar**  and choose the **More Commands** option.

Tools can be added and removed, as desired.

CELLS

INSERT, SELECT

Enter only one piece of information in one cell. For example, in a table with personal information, your name is entered in one cell, the surname in another, address in the following one, and so on.

An empty row or a column between data range and formula may lead to false results in some functions, so it is advisable to avoid them.

In calculations, it is recommended to insert a blank row before the row for the total amount. Numbers are usually the most used data type in spreadsheets, and they are aligned to the right side of the cell. When you enter decimal numbers, use comma as a decimal separator (in the case of Croatian settings). If we want to enter a number or a formula as text, put an apostrophe in front of that expression (for example '0041).

Date and time are remembered as numbers. When entering a date, use a point or a slash as a separator (dd/mm/yy - day, month, year). It is important to remember that there are no signs after entering a year. A date is remembered as an integral number, which represents time elapsed since January 1st, 1900. Time is remembered as a decimal number representing the number of seconds past since midnight. As for entering the separator, use a colon (hh:mm:ss - hours, minutes, seconds).

Ctrl + : - insert current date

Ctrl + Shift + : - insert current time

Cell content that Microsoft Excel application does not recognize as a number, date or time; is interpreted as text, and it aligns to the left side within a cell. If the text exceeds cell size, only part of the text entered will be visible. The entire cell contents can be seen in the Formula bar.

To select a cell:

- Click on it – a cell becomes active by a left-click on it, which indicates the colored border around it. The content of that cell is visible in the Formula bar and the changes we make (the cell's format, input, or deleting content) will refer to that cell.
- Keys with arrows - once we are positioned within a cell, we can move to the next cell by using the keys with arrows.
- Drag and drop method - press and hold the left mouse button, and pull the mouse pointer until the desired cell range is highlighted.
- Using the **Ctrl** key - press and hold down the Ctrl key, and press the left mouse button within the desired cells to select them. After selecting each desired cell,

release the Ctrl key. This allows us to select an arbitrary number of non-adjacent (non-neighboring) cells,

- Using the **Shift** key - select the first cell in a range (by a left-click on it), then press and hold the Shift key and use the arrow keys (or mouse) to select the last cell of desired cell range. This allows us to select multiple adjacent cells.

Rows and columns are selected by clicking on their headings (the appearance of the cursor changes to horizontal or vertical black arrow). If you want to select multiple rows or columns, click on its heading, and drag over the headings of all the desired rows or columns that you want to select.

We may also use the **Ctrl** key (for selecting non-adjacent) or the **Shift** key (for selecting neighboring) rows and columns.

To select the entire worksheet, click on the field in the upper left corner of the worksheet (on the left of column A).

Keyboard shortcut **CTRL + A** - if you click on an empty cell before using this shortcut, it will select the entire worksheet, and if you click on a cell with content, it will select all cells that have content and are located next to the selected cell.


EDIT CELL CONTENT


- Entering content - select the cell by pressing the left mouse button on a cell and enter text or a number.
- Adding content to cell – double-click the left mouse button on a cell and enter additional content.
- Modify existing content - select the cell you want to modify and enter new content.

If entered content exceeds cell width, it will be written across the adjacent cells if they are empty.

Shift between cells by:

- using the TAB key on the keyboard,
- using the arrow keys on the keyboard, or
- pressing the left mouse button within the desired cell.

Function **Undo**  is used when we want to go one step back; when we are not satisfied with the result and want to undo our last action. If we make a mistake, for example, accidentally delete a chart, the Undo function brings it immediately back. It is a practical and frequently used function. It is located in the Quick Access Toolbar, and it can also be run via the key combination **Ctrl + Z**.


Function **Redo**  negates the result of the Undo function. It can be used as many times as we used Undo. Run it via the Quick Access Toolbar button, or the key combination **Ctrl + Y**.



Functions **Find and Replace** are used when we want to find and replace small amounts of data. These functions are located on the **Home** tab within the **Editing** group. Click on the **Find & Select** icon and from the drop-down menu select the desired function. If you click the **Find** function (or use the keyboard shortcut **Ctrl + F**), a dialog box will open for you to enter the term you want to find. If you click on the **Find All** button, all found results will be shown, and if you click on the **Find Next** button, it will cross from the first to the next found result. In the **Find and Replace** dialog box, there is also the **Options** button, which allows us to determine search parameters. If you want to find the information written in Arial, for example, click on the **Format** button. The **Find Format** dialog box opens, in which you will need to click on the **Font** tab and choose the desired font Arial. Besides finding information within a specified worksheet, search can also be expanded to include the entire workbook.

Found data can be replaced with new data by using the **Replace** button (keyboard shortcut is **Ctrl + H**). In the **Find what** text box, type in the data you want to locate, and in the **Replace with** text box, enter the data you want it to be replaced with. It is also possible to set parameters for the Replace function.

SORT CELL CONTENT

In order to sort and filter data, once you have selected the desired data range, on the **Home** tab, within the **Editing** commands group, click on the **Sort and Filter** icon or, on the **Data** tab under the **Sort & Filter** group, click on the button:

-  to perform an **ascending** sort (from smallest to largest value, A-Z), or
-  to perform a **descending** sort (from largest to smallest value, Z-A).

The **Sort** function can be activated via the pop-up menu. First select the desired cell range, position the mouse cursor over the selected cells and press the right mouse button. From the pop-up menu that appears, point to the **Sort** command, and then choose  or .

Sort text

Before using the **Sort** function, it is necessary to determine data type of the selected cell range that we want to sort. In this case, we choose text. Following the same process as given in the last paragraph, you can either choose to **Sort A to Z** or **Sort Z to A**.

Text, which includes numbers stored as text, are sorted in the following order:

0 1 2 3 4 5 6 7 8 9 (space) ! " # \$ % & () * , . / : ; ? @ [\] ^ _ ` { | } ~ + < = > A B C D E F G H I J
K L M N O P Q R S T U V W X Y Z

Sort numbers

Cells, that are formatted to contain numbers, are sorted according to selected criteria - **Sort Smallest to Largest** or **Sort Largest to Smallest**.

Sort dates or times

Cells, that are formatted to contain date or time, are sorted according to selected criteria – **Sort Oldest to Newest** or **Sort Newest to Oldest**.

COPY, MOVE, DELETE CELL CONTENT

We can copy a single cell, a cell range, columns and rows, or the entire worksheet. Copied content can be pasted to the selected location within the worksheet, between worksheets or workbooks.

Copying through Home tab:

Select the cell, cell range, column, line, or a worksheet that you want to copy and select the **Copy** command on the **Home** tab, within the **Clipboard** group. Then click on the cell (column, row, worksheet or workbook) to which you want copy the content and from the same menu, choose the **Paste** command.


Right-click method:

Select the content you want to copy and click over it with the right mouse button. The pop-up menu opens, where you choose the **Copy** command. Position the mouse pointer to where you want to paste the content (click on it), and click the right mouse button. Again, the pop-up menu will open, from which you will choose the **Paste** command.

Keys combination:

Select the content you want to copy and press the **Ctrl** key + **C**. Click on the location where you want to paste and press the **Ctrl** key + **V**.

Using mouse:

Select a cell, press the **Ctrl** and position the cursor on the cell edge. When the cursor takes the shape of , press and hold the left mouse button and drag the mouse pointer to another location. Release the mouse button and then the **Ctrl** key.

AutoFill function is the quickest way of copying cell contents, entered formulas or cell formatting. Select a cell and position the mouse pointer in its lower right corner. When the



cursor is placed and black cross sign appears, click on it and pull the mouse pointer (up, down, left or right) until the cell contents are copied to the desired location in the worksheet. Using the AutoFill is very handy when copying formulas. It is enough to enter a formula once and apply it to the neighboring cell(s), by using this function.

For example, type 5 and 10 into cells A1 and A2, select the cells and drag the fill handle (located on the bottom right corner of the cells) down. The AutoFill function automatically continues the series (15, 20, etc.). If you press and hold down the **Ctrl** key, while applying the AutoFill function, 5 and 10 are copied below (the same principle applies to date and time).

By using the AutoFill function, a number will be copied, and in combination with the **Ctrl** key number, be increased by 1 in the next cell. The function will continue the series for several selected cells with numbers, and in combination with the **Ctrl** key, the numbers will be copied. Ditto for date and time.

Moving through Home tab:

The content of a cell can be moved to a different cell, worksheet, or workbook. To move a content, we use the **Cut** command located on the **Home** tab. Select the cell, cell range, column or row that we want to move and choose the Cut command located on the Home tab, within the **Clipboard** group. Click on the cell (column, row, worksheet or workbook) to which you want to move the content and in the same menu, choose the **Paste** command.


Right-click method:

Select the content that we want to move, and over the selected content, click the right mouse button. The pop-up menu opens from which you must select the **Cut** command. Position the mouse pointer to where you want to paste the content (click on it), and click the right mouse button. Again, the pop-up menu will open, from which you will choose the **Paste** command.

Keys combination:


Select the content you want to move, and press **Ctrl + X**. Click on the location where you want to move, and use the keyboard shortcut **Ctrl + V**.

Using mouse:

To move cell contents to another location on the same worksheet, first select the desired cells and position the mouse pointer over the border of selected cells, so that it changes to 4 arrows showing directions in which we can move the content . Then press and hold the left mouse button and drag the mouse to where we want to move the content.

Ways to delete cell contents

Through the Home tab:

Select the cell, cell range, column or row that we want to delete and choose ***Clear** button  on the **Home** tab, within the **Editing** group. As the drop down menu opens, select the **Clear All** command, if you want to delete the entire cell content (including formatting and comments).

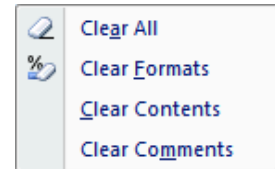


Fig.3 Clear button drop-down menu

Right-click method:

Select the cells whose contents you want to delete, position the mouse pointer over them and press the right mouse button. The pop-up menu opens from which you need to select the command **Clear Contents**. This method removes only cell contents, while its formatting remains unchanged.

Using keyboard keys:

Select cells and press the **Delete** key or the **Backspace** key. This method removes only cell contents, while its formatting remains unchanged.

WORKING WITH WORKSHEETS

ROWS AND COLUMNS

You can select a range of adjacent (neighboring) rows in one of 3 ways:

- Position the cursor on a row heading. When the cursor takes the shape of a black arrow, click on the row, hold down the left mouse button, and pull the mouse pointer until the desired number of rows is selected.
- Position on a row heading. When the cursor takes the shape of a black arrow, click on the row, press and hold down the **Shift** key and click on the last row that we want to select.
- Position on a row heading. When the cursor takes the shape of a black arrow, click on the row, press and hold down the **Shift** key and use the keys with arrows to select the desired rows.

Selecting nonadjacent (non-neighboring) rows

First, position the cursor on a row heading. When the cursor takes the shape of a black arrow, click on the row, press and hold down the **Ctrl** key and click on the desired rows, columns or cells to select them, and then release the **Ctrl** key.

Selecting columns is done in the same manner as selecting rows.

You can select a range of adjacent columns in one of 3 ways:

- Position the cursor on a column heading. When the cursor takes the shape of a black arrow, click on the column, hold down the left mouse button, and pull the mouse pointer until the desired number of columns is selected.
- Position the cursor on a column heading. When the cursor takes the shape of a black arrow, click on the column, press and hold down the **Shift** key and click on the last column you want to select.
- Position the cursor on a column heading. When the cursor takes the shape of a black arrow, click on the column, press and hold down the **Shift** key and use the keys with arrows to select the desired columns.

Select nonadjacent columns

Position the cursor on a column heading. When the cursor takes the shape of a black arrow, click on the column, press and hold down the **Ctrl** key and click on the desired rows, columns or cells to select them, and then release the **Ctrl** key.

Insert rows / columns

Rows can be inserted above a selected row and columns can be inserted to the left of a selected column. If you did not add tools to insert rows or columns on the **Ribbon**, the same can be done via the pop-up menu that opens up when you right-click on the place where you want to insert a row or column. Select **Insert** in the pop-up menu, and in the **Insert** dialog box that opens up, click Shift cells left, Shift cells up, Entire row, or Entire column. If you are positioned on a row or column (by having clicked on the row or column heading), the **Insert** command from the pop-up menu automatically inserts a row or column.

The **Insert** button is also located on the **Home** tab, within the **Cells** group. Choose the **Insert Sheet Rows** command or the **Insert Sheet Columns** command from the drop-down menu.

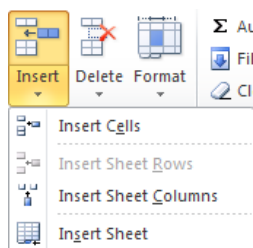


Fig.4. Insert button and its drop-down menu

Delete rows/columns

Position the cursor on a row or column heading, select it and on the **Home** tab, within the **Cells** group, click on the **Delete** button and select **Delete Sheet Rows** command or **Delete Sheet Columns** command.

or,

Select the row or column you want to delete by clicking on its heading. A right-click will open up the pop-up menu, from which you need to choose the **Delete** command. Another way of deleting a row or column is by right-clicking on a cell and selecting **Delete** in the pop-up menu. In the **Delete** dialog box that opens up, click on any one of Shift cells left, Shift cells up, Entire row, or Entire column commands.

Changing row height / column width

Position the cursor over a row or column heading and press the right mouse button to open the pop-up menu. Depending on whether it is row or a column, select the **Row Height** command or the **Column Width** command. Enter the desired height or width in the dialog box that appears.


or,

Position the cursor on the edge of the row or column heading. When the cursor changes to the shape of:

-  pull the mouse pointer until the targeted row height is reached

-  pull the mouse pointer until the targeted column width is reached

Setting optimum height or width

If contents of some cells in a row or column exceed the cell-size, the entire cell data is not shown. In that case, optimizing the cell height and width is necessary so that the content of all cells is visible. Position the cursor on the appropriate row / column heading, and when the cursor changes to the shape of , double-click the left mouse button.

FREEZE AND UNFREEZE ROW/COLUMN TITLES


Freeze Panes command is used when working with extensive tables that contain large amounts of data. It is easier to access the information if some of the rows and/or columns are "frozen". If you are navigating through long lists of data, it is desirable to freeze a row or column with their names, so that you may know, at any given time, what the information on the list is.

First you need to select the part of the worksheet that you want to freeze (i.e. make permanently visible) in the following way:


- Freezing rows and columns: select the cell on the right side of the column and below the row you want frozen and choose the **Freeze Panes** command.
- Freezing either multiple rows or multiple columns: select the column to the immediate right of the columns you want to freeze, or select the row immediately below the rows you want frozen, and choose the **Freeze Panes** command as earlier.

The **Freeze Panes** button is located on the **View** tab within the **Window** group. Clicking on the button opens a drop-down menu from where you can choose the **Freeze Panes** command. Among the available options, you can also choose the **Freeze Top Row** and the **Freeze First Column** commands.

WORKSHEETS

Switching from one worksheet to another is done by clicking on the tab with worksheet names, at the bottom of the application window. If we have not changed their names, their generic names will be shown (Sheet 1, Sheet2 etc.). Active worksheet tab (worksheet where we are located) is highlighted in relation to other worksheets and its title is bolded. If there are lots of worksheets (or they have long names), the arrow buttons  located in front of the worksheets, can be used to display their names.

Inserting worksheets:

- Click on the icon that is located next to the name of the last worksheet in the workbook at the bottom of the application window 
- Right-click on the sheet in front of which we want to insert a new worksheet and from the pop-up menu choose the **Insert** command. The dialog box that appears will have worksheet as an object for insertion.
- On the **Home** tab, within the **Cells** group, click on the **Insert** icon and from the drop-down menu choose the **Insert Sheet** command
- The key combination **Shift + F11**

Deleting worksheets:

- Right click on the worksheet tab that you want to delete and choose **Delete**.
- On the **Home** tab, within the **Cells** group, click on the Delete icon and from the drop-down menu, choose the **Delete Sheet** command

For better orientation between worksheets, naming worksheets to suit the purpose, instead of leaving their generic names (Sheet 1, Sheet 2 etc.), is recommended.

Moving and copying worksheets:

- Using the drag and drop method - click on the worksheet you want to move, and pull the mouse pointer to where you want to position it.
- On the **Home** tab, within the **Cells** group, click on the **Format** icon and from the drop-down menu, choose the **Move or Copy Sheet** command. A dialog box will open, giving you the option of moving the worksheet within the same, or to a different workbook (and selecting the position that worksheet will take in relation to other worksheets). There is also the option to copy the selected worksheet - you need to mark the **Create a copy** check box
- Right click on the worksheet and from the pop-up menu that appears, choose the **Move or Copy** command- the dialog box that opens is the same as described in the previous paragraph.

Renaming worksheets:

- Double-click on the worksheet you want to rename and type in the new name.
- On the **Home** tab, within **Cells** group, click on the **Format** icon and from the drop-down menu, select the **Rename Sheet** command.
- Right click on the worksheet you want to rename and from the pop-up menu that appears, choose the **Rename** command

FORMULAS AND FUNCTIONS

FORMULAS

By entering a formula in one cell, we can calculate the values in other cells. It is important to remember that each formula begins with the sign for equal (=) and can contain functions (e.g. SUM, ROUND), operators (e.g. +,*,>), references (e.g., D3) or constant (e.g. no. 2). Functions are predefined expressions (formulas) that perform certain task. References (names) represent the address of a cell or cell range (D3 or D3: D4).

If, for example, we want to calculate the product of two cells (e.g., D3 and D4), enter the formula = **D3 * D4** in the cell where you want to display your results.

- use the required sign for equal (=)
- enter cell references (addresses) from which content value will be taken for this operation (D3 and D4), or click on cells
- enter mathematical operator which you want to use (*)

	A	B	C	D	E
1					
2					
3		Cell 1	D3	4	
4		Cell 2	D4	5	
5		Addition	=D3+D4	9	
6		Subtraction	=D3-D4	-1	
7		Multiplication	=D3*D4	20	
8		Division	=D3/D4	0,8	
9		Squaring	=D3^2	16	
10		Root	=D3^(1/2)	2	
11					

Fig.5 Examples of often used formulas

Some standard errors while entering formulas

#NAME? error appears when Microsoft Excel application does not recognize the formula content, because of the following reasons:

- entered name does not exist
- entered name is invalid
- entered function name is incorrect
- introduced **EUROCONVERT** function without installing and loading the Euro Currency Tools Add-in
- left out a colon (:) when entering a range of cells

#DIV/0! error occurs when a number is divided by zero or an empty cell.

#REF! occurs in an invalid cell reference (it is possible that we have deleted cells that referred to other formulas).

Relative address

Addressing cells in Microsoft Excel application is relative. It is based on the relative address of a cell containing a formula, and cells whose addresses are in the formula. When copying the cell containing the formula, its relative address changes, as well as the relative cell references contained within the formula. To avoid entering the formula all over again, copy it, and it will automatically adjust to the cell in which it is copied.

Examples of relative cell referencing (i.e. cell column letter and row number): A7, B2, H13 etc.

D2		fx =B2+C2			
	A	B	C	D	E
1					
2		1	2	3	
3					
4					
5					

D3		fx =B3+C3			
	A	B	C	D	E
1					
2		1	2	3	
3		4	5	9	
4					
5					

We will add up values in cells **B2** and **C2** by entering the formula **=B2+C2** into **D2** cell. Since cell references are relative, it is enough to copy the formula, because it adjusts to the cell to which it is copied. Select D2 cell, position the cursor on its right border, press and hold down the left mouse button and simply pull the mouse pointer down. The result is visible on the right figure: formula in D2 cell is applied to D3 cell.

Absolute address

Another type of cell referencing is available known as absolute addressing. It is used when we do not want the formula, on copying, to adapt to a new cell, but instead just use the address of that particular cell. Absolute address, unlike the relative, is determined by fixed cell location. To make cell address absolute, use the **F4** key or enter sign **\$** in front of the column letter and row number.

Examples of absolute cell addressing: **\$B\$11**, **\$D\$8**, **\$E\$3** etc.

Examples of **mixed addresses**

- **B\$11** (relative address of column B and absolute address row 11),
- **\$B11** (column B absolute address and row 11 relative address)

B11		fx 1000					
	A	B	C	D	E	F	G
1							
2							
3		distance-in-km		distance-in-m			
4		5		5000		=B4*\$B\$11	
5		18		18000		=B5*\$B\$11	
6		24		24000		=B6*\$B\$11	
7							
8							
9							
10							
11		1000		1 km = 1000 m			
12							
13							
14							
15							

In this case, we are using absolute addressing **\$B\$11** of a cell, and we do not want it to adapt to a new cell when copied. This ensures the multiplication with the same cell, i.e. with the number 1000.

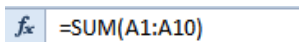
FUNCTIONS

Functions are predefined expressions (formulas) that perform calculations using values called function arguments.

Each function has its own syntax: function name (argument, argument2,...).

Methods of entering functions:

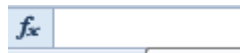
Direct entering is a complex method of entering function, because it implies knowledge of its syntax. It is performed by positioning in the cell, where we want to display the result, and entering the correct function form. After typing the first letters of the function, a drop-down menu appears, where you select the appropriate function (using the **TAB** key or by double-clicking the left mouse button). Once we have selected a function, it automatically switches to enter arguments, which can be entered manually or selected with the mouse. If there are several arguments, they are separated by ',' (comma), and if it involves entering criteria or some kind of text, it should be placed in quotation marks. Entered function can be seen in the cell, as well as in the Formula bar.



To calculate, for example, sum of cells range (A1:A10) write the following function:
=SUM(A1:A10)

or, more in a more tedious way as =SUM(A1,A2,A3,A4,A5,A6,A7,A8,A9,A10)

Insert function button:

- **Insert function** button on the Formula Bar 
- Via the **Home** tab, within **Editing** group, click on the arrow next to the icon Σ that opens the drop-down menu

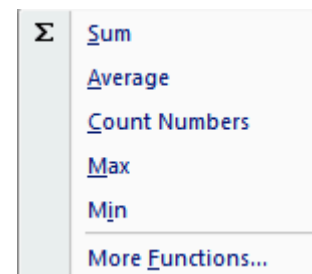



Fig.8. Insert function via Home tab

- Via the **Formulas** tab - select the cell in which you want to display the result and on the **Formulas** tab choose the **Insert Function** icon 
 - A dialog box will open where you can choose a function to insert. If you choose the ROUND function, for example, there are two arguments to enter. In the

Number field, enter the location of the cell we want to round up (e.g. A1), and under the **Num_digits** field, enter the number of decimal places to which we want round up the cell amount.

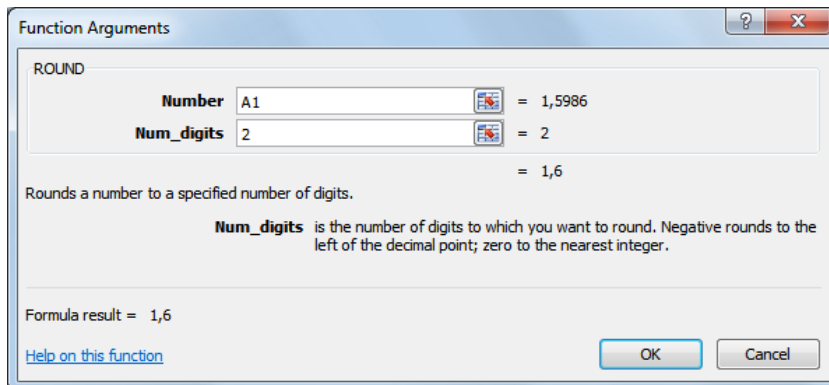


Fig.9. Function Arguments dialog box

SUM function

SUM function adds all numbers within certain range of cells. Its syntax is **SUM(number1, number2,...)**, where **number1** and **number2** represent the series of arguments (10-30) we want to add.

To calculate, for example, the sum of cells range (A1:A10), enter function **=SUM(A1:A10)** .

AVERAGE function

AVERAGE function is used to calculate the arithmetic mean (average). Its syntax is: **AVERAGE(number1, number2,...)**, where **number1** and **number2** represent the series of arguments (10-30) whose average value we want to determine.

To calculate, for example, the arithmetic mean of cells range (A1:A10), enter **=AVERAGE(A1:A10)** .

MIN and MAX functions

MIN and MAX functions determine the minimum or maximum value from a default set of values. Syntax is as follows: **MIN(number1, number2,...)** and **MAX(number1,number2,...)**.

If we want to calculate the minimum value of cells range (A1:A10), enter **=MIN(A1:A10)**.

ROUND function

ROUND function is used in order to round off a number to a certain number of decimal places. Its syntax: **ROUND(number, num_digits)**, where **number** represent a number to round up, and **num_digits**, the number of decimal places to which we want to round off.

For example, if we want the number in cell A1 rounded off to two decimals, enter **=ROUND(A1;2)** .

COUNT function

COUNT function counts all the non-empty cells that contain numbers in a certain cell range. Its syntax is: **COUNT(value1, value2,...)**, where **value1** is the required argument, and contains cell references or ranges of cells, where we want to count data, and **value2** is an additional argument.

To count, for example, all non-empty cells containing numerical values in cell range (A1:A10), enter **=COUNT(A1:A10)** .

COUNTA function

COUNTA function counts all non-empty cells containing any kind of data (including those with error) in a certain cell range. Its syntax is **COUNTA(value1, value2,...)**, where **value1** is the required argument, and contains cell references or range of cells, where we want to count data, and **value2** is the additional argument, and so on.

To count, for example, all non-empty cells in the cell range (A1:A10), enter **=COUNTA(A1:A10)** .

IF logical function

IF function is used when we want to verify the truth of logical statements set in the function's first argument, provided that:

- if the statement is true - the function writes the value of the default second argument or calls another function
- if the statement is false - the function writes the value of the default third argument or calls another function.

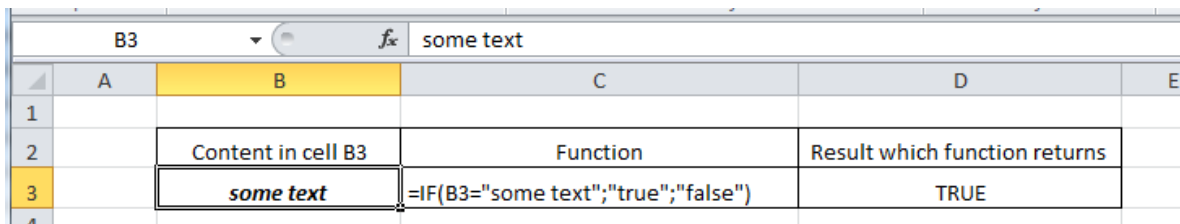
Its syntax is: **IF(logical_test, [value_if_true], [value_if_false])**, where:

1. the first argument **logical_test** - any expression that can be valued as TRUE or FALSE
2. the second argument **value_if_true** - value that the function returns if the **logical_test** is true
3. the third argument **value_if_false** – value that the function returns if the **logical_test** is false

For example, if we want to check whether a phrase “some text” is entered in cell B3, first enter the required equal sign, then the function name IF and then within the brackets enter:

1. the first argument, i.e. the statement you are testing – **B3=“some text”**
2. the second argument, i.e. the value you want the function to return if the first argument is true - in this case we want it to write the word "true"
3. the third argument, i.e. the value you want the function to return if the first argument is not true - in this case we want it to write the word "false"

While listing the arguments, we must not forget the separators (;) between the arguments.




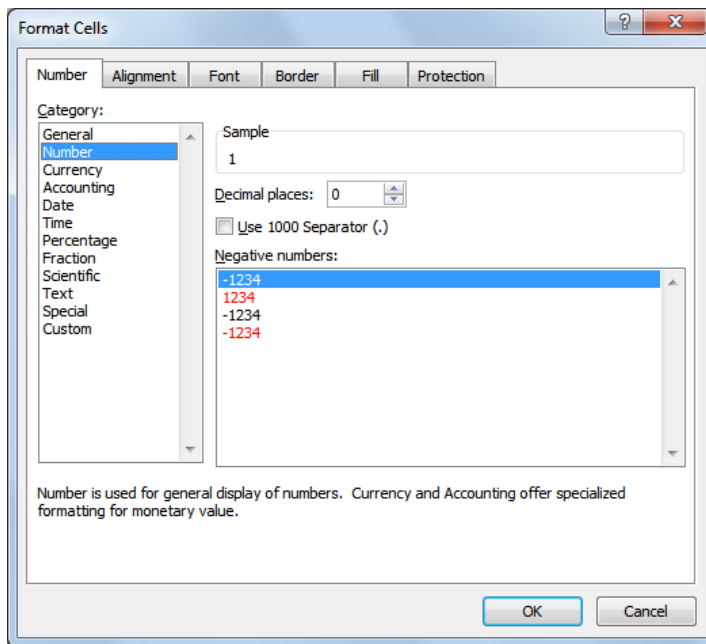
	A	B	C	D	E
1					
2		Content in cell B3	Function	Result which function returns	
3		<i>some text</i>	=IF(B3="some text";"true";"false")	TRUE	
4					

Fig.10. Example of IF function

FORMATTING CELL CONTENT

To determine the cell type, and thus their display, use the **Format Cells** command. The command can be reached via the following means:

- In the **Home** tab, within the **Number** group, click on the arrow  to open a dialog box.
- Right-click on the cell you want to format and from the pop-up menu that appears, choose the **Format Cells** command.



The **Format Cells** dialog box will open, from which you need to choose the **Number** tab or any other appropriate tab.


Fig.11. Format Cells dialog box

When formatting numbers, we can choose the number of decimal places or display point as the thousands separator.

If you choose date as data type, you can display it in several formatting options, such as 29th July 2010 or 29.07.10.

In the currency data type, choose the appropriate number of decimal places and the currency symbol, such as \$100.00.

Data can be displayed as a percentage, whose number of decimal places can also be determined.

On the **Home** tab, within the **Font** group, there are tools to change the font type and size, bold, italic or underlined display and change the text color. Additionally, to add some effect (like superscript, strikethrough etc.) to a cell content, click on the arrow  in the lower right corner of the **Font** group. The **Format Cells** dialog box will open, in which you can select the desired effect.

Font type and size

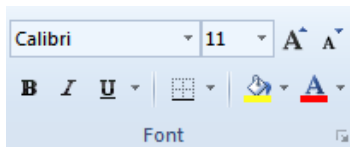
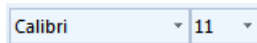


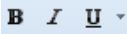
Fig.12 Font group

Select the cells whose font you want to change, for example from Times New Roman to Arial. Click on the arrow next to the font name (in this case Times New Roman), and the drop-down menu opens, where you choose font Arial. The size of the font can also be determined, by typing in the value or selecting from the drop-down menu.





or,

Right-click over the selected cell(s) → **Format Cells** command from the pop-up menu → **Font** tab

In order to display cell contents in bold, choose the **Bold** icon, or use the key combination **Ctrl + B**. To display font in italic, use the **Italic** icon or the key combination **Ctrl + I**, and for underlined font, use the Underline icon or the key combination **Ctrl + U**. 

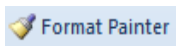
To display a text as a double strikethrough, click on the arrow next to the Underline icon. From the drop-down menu, choose **Double Underline**.

By choosing the **Fill Color** icon  you can change the background color of the selected cell(s). Clicking on the arrow next to the icon opens the drop-down menu with colors palette. If we want to change the cell contents color, we will select the **Font Color** icon .

or,


Right-click over the selected cell(s) → **Format Cells** command from the pop-up menu → **Fill** tab.

Right-click over the selected cell(s) → **Format Cells** command from the pop-up menu → **Font** tab → **Color** option

If we want to utilize the existing format of some cells, use the **Format Painter** tool. Select the cell whose formatting we want to transfer, click the icon  and apply the formatting to the new cell(s) just by selecting it/them.

Alignment, borders

In order to show a longer text in a cell in several rows, use the **Wrap Text** command.

The command can be accessed via the **Home** tab, within the **Alignment** group, by clicking the **Wrap text** icon .

or,

Right-click the mouse button over the selected cell(s) → **Format Cells** command from the pop-up menu → **Alignment** tab → **Wrap text** option

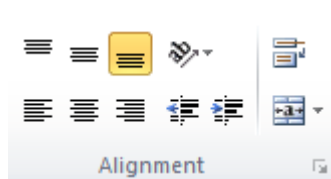










Fig.13 Alignment group

Within the **Alignment** group, there are different options concerning the position of cell contents in its relation to cell borders. The **Alignment** group is located on the **Home** tab and contains commands for:

-  **Horizontal Alignment** – Align Text Left, Center, Align Text Right
-  **Vertical Alignment** – Top Align, Middle Align, Bottom Align
-  **Text Orientation** – Angle Counterclockwise, Angle Clockwise etc.
-  **Indent** – Decrease Indent, Increase Indent
-  **Wrap text**
-  **Merge and center cells** – Merge & Center, Merge Across, Merge Cells, Unmerge Cells

If one does not see the icon of the command they want to use, click on the arrow in the lower right corner of the group . From the open dialog box, choose the format (for example, specify the angle under which the content of the cells will be displayed). The same dialog box can be opened by using the right click method. Position over the selected cell and click the right mouse button. From the pop-up menu, choose the **Format Cells** command. The **Format Cells** dialog box will open, in which you can select the **Alignment** tab.

Merging cells and centering title over series of connected cells

If we want to merge several cells and align the text within them centrally, use the **Merge & Center** tool  located on the **Alignment** tab.

When we want to merge two or more adjacent cells (horizontal or vertical), use the **Merge Cells** command. Merging cells can be done in the following ways:

Via the Home tab:

On the **Home** tab, within the Alignment group, click on the arrow next to the **Merge & Center** icon. Drop-down menu opens, from which you choose the **Merge Cells** command. In order to merge the cells and align the cell content centrally, use the **Merge & Center** command.

Right-click method:

Select the cells to merge, position the cursor on them and click the right mouse button. From the quick menu that opens, choose the **Format Cells** command which will open the **Format Cells** dialog box, where you select the **Alignment** tab. Confirm the checkbox next to the **Merge Cells** command.


If two or more cells that contain data are merged, only contents of the first, or the upper-left cell in the series, will be preserved.

Unmerge cells


Via the Home menu: select the merged cell and on the **Home** tab, within the **Alignment** group, click on the arrow next to the **Merge & Center** icon and from the drop-down menu, choose the **Unmerge Cells** command.

Right-click method: select the cell to unmerge, position the mouse pointer over it and press the right mouse button. From the pop-up menu that opens, choose the **Format Cells** command that opens the **Format Cells** dialog box. Go to the **Alignment** tab and uncheck the box next to the **Merge Cells** command.

Adding cell borders

On the **Home** tab, within the **Font** group, choose the icon . The **Format Cells** dialog box opens. On the **Border** tab, choose the type (inside borders, outside borders, only top or bottom border), style (full, double, dotted line etc.), and the border color.

Another way to format cell borders: press the right mouse button over the selected cells → from the pop-up menu, choose the **Format Cells command** → **Border** tab

By clicking on the arrow next to the icon  in the **Font** group of the **Home** tab, a drop-down menu opens which, apart from the previously listed options, offers the **Draw Border** and **Erase Border** options, which can be useful when creating more complex tables.

WORKING WITH CHARTS

Chart is a graphical representation of tabular data. Chart and tabular data are linked, i.e. table changes reflect on the chart.

CREATING CHARTS

Tools for creating charts are located on the **Insert** tab, within the **Charts** group. It is necessary to select the cells that will be displayed in the chart, and click on the icon. Various types of charts are offered: Column, Line, Pie, Bar etc.

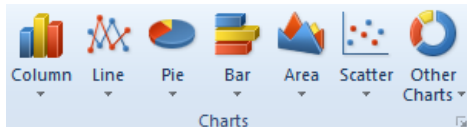


Fig.14 Charts group on Insert menu

The required chart is selected by pressing the left mouse button on the appropriate chart icon, after which checkpoints appear. Selecting a chart on the Ribbon triggers an extra tab **Chart Tools** to appear, with three tabs: **Design**, **Layout** and **Format**.

If, at some point, we change our mind and want the data to be shown, for example, instead of in a column, in a line chart, click on the chart and:

- On the **Chart Tools** tab choose the **Change Chart Type** icon  , or
- Right-click on the chart and from the pop-up menu, choose the **Change Chart Type** command


MOVE, RESIZE, DELETE CHART

In order to move the chart to another location within the same worksheet:

- Press and hold down the left mouse button, and pull the mouse pointer to a new location.
- Cut it using the **Cut** command and paste it to a new location, using the **Paste** command.

To move the chart to another worksheet:

- Press the right mouse button and from the pop-up menu, choose the **Move Chart** command.

- On the **Chart Tools** tab choose the **Move Chart** icon .
- Cut it and then paste it to a new location.

Resize the chart in the following ways:

- Double-click over the chart borders → **Format Chart Area** dialog box opens → Click on **Size** tab.
- Right-click over the chart borders → Select **Format Chart Area** in pop-up menu → Click on **Size** tab.
- Position the mouse pointer over the chart corner and when the pointer changes shape to a double-headed arrow, press and hold down the left mouse button and pull the mouse pointer until the desired size is reached.

Delete chart

Click on the chart to select it and press the **Delete** key in order to delete it.

EDITING CHART

Add chart title:

- Select the chart (by clicking on it), and on the **Layout** tab, click on the **Chart Title** icon.
- Choose among the title displaying options:
 - **Centered Overlay** > title is displayed centrally aligned over the chart
 - **Above Chart** > title is displayed above the chart, which will, in some cases, be reduced
- Within the **More Title Options**, there are detailed display and formatting options for the chart title

In order to delete the chart title, first select it and

- after pressing the right mouse button, choose the **Delete** option from the pop-up menu
- press the **Delete** key

To format the chart title, it is necessary to select it first and then:

- Using the tools on the **Home** tab, format the title as desired
- Press the right mouse button and from the pop-up menu, choose the **Format Chart Title** command. A new menu with different formatting options will appear

Add legend to chart: values/numbers, percentages

To add a legend to the chart, use the **Legend** icon, which is located on the **Chart Tools** extra tab (tab is visible after selecting the chart), under **Layout**. Similar to formatting the chart title, click the **More Legend Options**, which opens the menu with more detailed options regarding legend display and design.

By using the **Data Labels** tool found beside the **Legend** icon, data values can be displayed. Within the **More Data Labels** option, there are options for displaying and formatting values. Additionally, values can be set to be displayed as numbers, percentages etc.

Data values can also be displayed by pressing the right mouse button over the set of chart data (for instance, right-clicking over a column in a bar chart) and from the pop-up menu, choosing the **Add Data Labels** command.

Change chart background color, legend fill color

To change the chart background, first select the chart, right-click on it and choose the **Format Chart Area** command from the pop-up menu that appears. New menu opens, with various formatting options, including to change fill color (**Fill**). Also, when you select the chart, on the **Chart Tools** extra tab, in the **Format** tab, select the **Shape Fill** tool and change the chart background color.

The same procedure applies to legend fill color, but instead of selecting the entire chart, select only the legend area.

Change color of column, bar, line, pie slice in chart

Similar to changing the background color of the chart area or legend, the same procedures apply to changing the color to column, bar, line, pie, etc. in chart. Only the first step is different: instead of selecting the entire chart, we select columns (or a single column - by double clicking the left mouse button on it), bar, line, etc. Then we choose from the following:

- Format Plot Area - format chart plot area
- Format Data Point (e.g. one column),
- Format Data Series (e.g. all columns),
- Format Gridlines (e.g. chart lines), or Format Axis.

As previously mentioned, we can also use the **Shape Fill** (or **Shape Outline** for lines) located on the **Format** tab.

Text in titles, legend or axis is formatted the same way as any other text, i.e. first select that part of the chart (title, axis, legend), and use the tools located in the **Font** group on the **Home** tab.

PRINT

PRINTING SETTINGS

Worksheet margins

On the **Page Layout** tab, there are several tools for page formatting, including tools for setting margins – the **Margins** tool. Three types of margins are predefined:

- Normal
- Wide
- Narrow

If you click on the **Custom Margins** button, a window opens, through which we can set all four margins: top, bottom, left and right, and we can adjust the position of headers and footers.


Margins can also be changed on the **View** tab, while in the **Page Layout** view. When the cursor is located along the left or right side of horizontal, and top or bottom of the vertical ruler, the cursor will change its shape to an arrow with two points. Then press the left mouse button and drag the pointer, until margins increase or reduce to the desired size.

Worksheet orientation

On the **Page Layout** tab, the **Orientation** tool for changing worksheet orientation to **Portrait** (vertical paper orientation) or **Landscape** (horizontal paper orientation), is located.

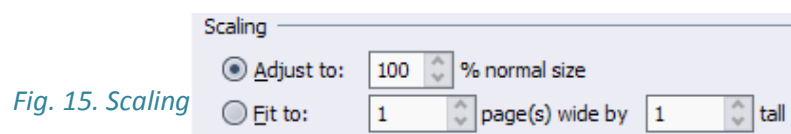
Resizing paper

Right next to the **Orientation** button, on the **Page Layout** tab, the **Size** button is located. Clicking on it opens up the drop-down menu, with a large number of specific page sizes, e.g. Letter 21.59 x 27.94 cm, or A5 14.8 x 21 cm, etc.

Click on the button  in the lower right corner of the **Page Setup** group, on the **Page Layout** tab. The **Page Setup** dialog box opens, whose **Page** tab displays the tools for changing orientation and paper size.

Page Setup

Clicking on the **More Paper Sizes** option, the last option on the drop-down menu under the **Size** tool, opens up the **Page Setup** dialog box. Here, we can adjust the page setup to fit the worksheet contents on a specified number of pages.



or,

Page Layout tab → **Scale to Fit** group of commands

Header and footer in worksheet

By clicking on the **Header & Footer** icon on the **Insert** tab, header and footer are inserted in the worksheet. Three fields, in which we add text, appear in header and footer: on the left and right side, and in the middle. These fields contain pre-set text alignments: the left field has left alignment, center has central alignment, while the right field has right alignment. To add text into a field, click on it and type in. To change or delete the text, select the field again, (it will automatically select the text as well) and type a different text, or press the **Delete** key.

For easy transfer between header and footer, just press the **Go to Footer** button or the **Go to Header** button - depending on where you are at that moment. These buttons are located on the extra tab **Header & Footer Tools**, on the **Design** tab that appear when working with headers and footers.

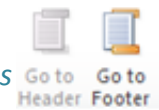


Fig. 16. Go to Footer and Go to Header buttons

or,

View tab → **Workbook Views** group of commands → **Page Layout** tool → click on the header or footer area

Fields

Some already prepared elements can be inserted in headers and footers. They are found on the extra tab **Header & Footer Tools**, within the **Header & Footer Elements** group, on the **Design** tab.

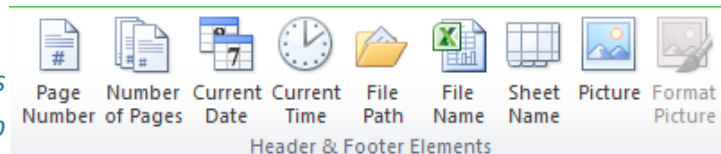


Fig.17. Header & Footer Elements group

- Page Number (&[Page])
- Number of Pages (&[Pages])
- Current Date (&[Date])
- Current Time (&[Time])
- File Path (&[Path]&[File])
- File Name (&[File])
- Sheet Name (&[Tab])
- Picture – used to insert picture stored on computer

Syntax can be typed in manually, and the result will be the same, as if we clicked on the button (e.g. (& [Page])) for page numbers). The elements are changed and deleted the same way as plain text - select the field (it selects syntax of the element) and enter a different syntax (or press another button), or just delete it by pressing the **Delete** key.

PREPARING TO PRINT

Spelling tool, located on the **Review** tab  , is used for checking document spelling.

Running the tool opens the dialog box that offers spelling suggestions of words that the application does not recognize, with the following options:


- Ignore once - ignores spelling error and moves to the next word that it does not recognize
- Ignore all - ignores any recurrence of a misspelled word
- Change - changes the misspelled word with the word selected on the **Suggestions** list
- Change all - changes every misspelled word with the word selected on the **Suggestions** list


Word that is not in the dictionary can be entered by pressing the right mouse button and choosing the **Add to dictionary** tool, from the pop-up menu. The application will no longer recognize that word as misspelled.

Checking errors in formulas

To check formulas for syntax errors, use the **Error Checking** button located on the **Formulas** tab. If error is found, the **Error Checking** dialog box will open.

Turning gridlines on and off

To turn gridlines on or off, on the **Page Layout** tab, click on the arrow  , located on the lower right corner of the **Page Setup** group of commands. In the dialog box that opens, go to the **Sheet** tab and within the **Print** group of commands, mark the **Gridlines** checkbox in order to print gridlines.

The **Sheet** tab can be directly opened by pressing the arrow  , located on the lower right corner of the **Sheet Options** group, on the **Page Layout** tab.

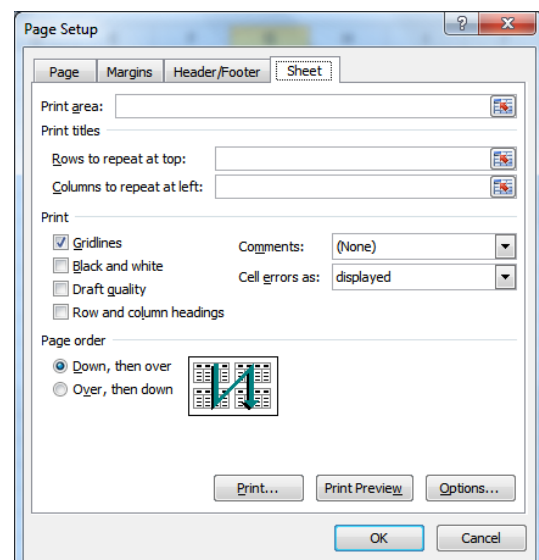


Fig.18 Print Gridlines

Show row and column headings

In order to show row and column headings on printed out tables, select the **Print** checkbox under **Headings**, found in the **Sheet Options** group on the **Page Layout** tab.

If options for gridlines and row and column headings are turned on, the printed out table will look like this.

	A	B	C	D	E
1					
2					
3		Temperatura zraka	Srednja [°C]	Aps. maks. [°C]	Datum
4		Dubrovnik	24,8	35,4	24-srp-07
5		Osijek	21,6	40,3	1-srp-50
6		Rijeka	23,3	40	19-srp-07
7		Šibenik	25	38,2	24-srp-87
8		Split	25,8	38,6	5-srp-50
9		Varaždin	20,3	39,3	5-srp-50
10		Zagreb	20,8	40,4	5-srp-50
11		Zavižan	12,5	27,6	27-srp-83

Fig.19. Table example – including the display of gridlines and row and column headings

Automatic printing of row(s) repeating at top on each page

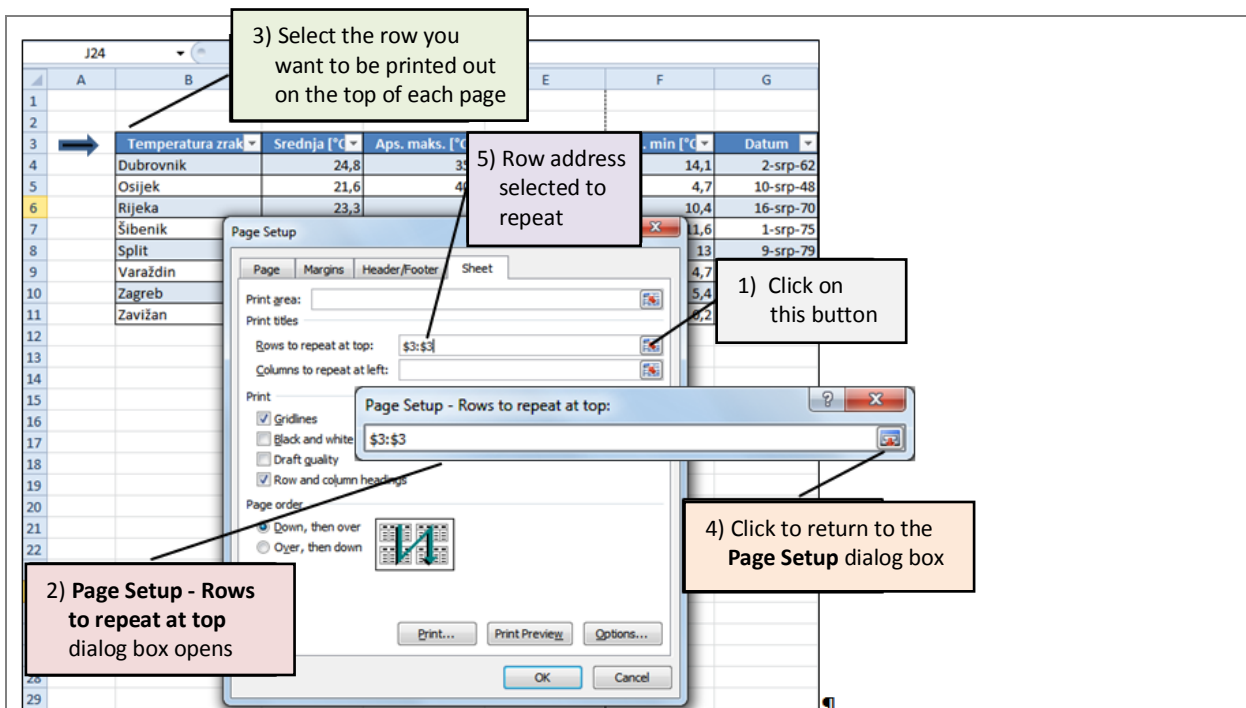


Fig.20. Page Setup dialog box – automatic printing of the title row

On the **File** menu, choose the **Print** command and preview the worksheet chosen for printing on the right side of the window.

Select print area

From the **File** menu, choose the **Print** to get an overview of all print settings. Select the area to print from the following options:

- **Print Entire Workbook**
- **Print Active Sheets**

- **Print Selection** (before selecting this option, select a part of the worksheet that we want to print).

At the top of the window, we determine the number of copies to print by entering the value in the **Copies** field or using the arrows up and down next to it.

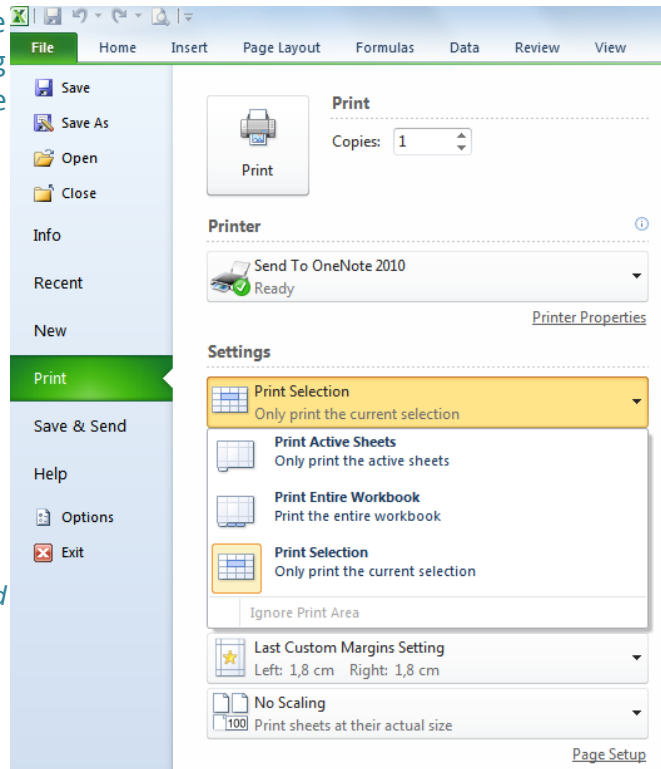


Fig.21. Print command

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