

CHAPTER 1

InFocus

SPREADSHEETS

Spreadsheets are very easy to use and make working with numbers and different kinds of calculations very simple. There are no cryptic commands you have to perform in order to view the data you wish to see and no complex understanding is required of menus functions.

So it's not hard to understand why spreadsheets have become a favourite in the computer application world. But what exactly are spreadsheets? How do they work? What are the basic underlying concepts, and where are they best deployed?

In this session you will:

- ✓ gain an understanding of spreadsheets and how they work
- ✓ gain an understanding of the size and capacity of a spreadsheet
- ✓ gain an understanding of what a spreadsheet can do for you
- ✓ gain an understanding of what spreadsheets can be used for and what is inappropriate.

HOW SPREADSHEETS WORK

Word processing packages are designed to process words – they let you write letters, compose faxes, prepare reports, write books, and much more. **Spreadsheet** packages on the other

hand, are designed to process numbers. While word processing applications are perfect for creating documents, spreadsheets are ideal for budgets, statistics, sales analyses, and the like.

What Is A Spreadsheet?

According to the *Oxford Dictionary of Computing* a spreadsheet is...

“A program that manipulates tables consisting of rows and columns of cells, and displays them on a screen; the cells contain numerical information and formulas, or text... The value in a numerical cell is either typed in or is calculated from a formula in the cell; this formula can involve other cells. Each time the value of a cell is changed by typing in a new value from the keyboard, the value of all other cells whose values depend on this one are recalculated.”

The screen below shows a spreadsheet application being used to calculate weekly pay for four employees. Spreadsheet applications are laid out as tables comprising **rows** and **columns** – notice how the columns have alphabetical headings and the rows are numbered (down the side) numerically. The intersection of a column and a row is known as a **cell**. Your data, comprising text (referred to as **labels**), numbers (referred to as **values**) or **formulas** is typed into these cells.

Text is typed into cells and is normally used as labels – here text has been used as headings, to list employees, and to identify the types of calculations.

	A	B	C	D	E	F
1	Weekly Pays					
2						
3	First Name	Last Name	Hourly Rate	Hours	Gross Pay	
4						
5	Margaret	Adams	15.50	24.00	372.00	
6	John	Brown	16.75	16.20	271.35	
7	Grace	Francis	12.50	12.00	150.00	
8	Stephen	Simpson	9.65	18.30	176.60	
9						
10			Total	70.50	969.95	
11			Average	17.63	242.49	
12			Maximum	24.00	372.00	
13			Minimum	12.00	150.00	
14						
15						

Numerical information appears here as values representing the Hourly Rate and the Hours worked.

It also appears here as **formulas** which calculated the Gross Pay, the Total, the Average, and the Maximum and Minimum hours and pays.

What Are Formulas?

In the example above, the gross pays, total, average, maximum, and minimum figures are **formulas** that are dependent on the data values under **Hourly Rate** and **Hours**. Each time a value in **Hourly Rate** or **Hours** is changed, all of the formulas that are dependent on that value are recalculated instantly. In the screen below, the hours worked by **Stephen Simpson** have changed from **18.30** to **27.50**, and the hourly rate for **Grace Francis** has increased from **12.50** to **18.00** – notice how the relevant **Gross Pay** information and statistics have changed.

	A	B	C	D	E	F
1	Weekly Pays					
2						
3	First Name	Last Name	Hourly Rate	Hours	Gross Pay	
4						
5	Margaret	Adams	15.50	24.00	372.00	
6	John	Brown	16.75	16.20	271.35	
7	Grace	Francis	18.00	12.00	216.00	
8	Stephen	Simpson	9.65	27.50	265.38	
9						
10			Total	79.70	1,124.73	
11			Average	19.93	281.18	
12			Maximum	27.50	372.00	
13			Minimum	12.00	216.00	
14						
15						

Only two changes, to the value in hours for Stephen Smith and the hourly rate for Grace Francis, led to the instant recalculation of many of the formulas in the other cells – this is an important aspect of spreadsheeting.

THE CHARACTERISTICS OF A SPREADSHEET

Imagine several large sheets of paper, each ruled into columns and rows, and you have the concept underlying the structure of a spreadsheet – except that spreadsheets are electronic pieces of

paper. Each sheet is where you can do your work, so these individual sheets have become known as worksheets. Spreadsheets have been around since the late 1970s.

A History Of Spreadsheets

Spreadsheets were developed with a specific use in mind. One of the earliest spreadsheet programs was developed in the mid-70s by Dan Bricklin, an MBA student at *Harvard Business School*.

Dan found that he had to create a number of complex business models that required tables of numbers that had to be constantly added and averaged. These numbers were written up on large sheets of paper with grand totals and averages at the bottom. He was required to enter new numbers and recalculate the bottom line to come up with a variety of business models. Dan got a bit tired of doing this on his calculator. So he developed an electronic version of a large sheet of paper that was ruled into columns and rows, and that could perform calculations. Spurred on by his friends, he refined this product and marketed it as *VisiCalc*. It was very successful with accountants and other people who had to prepare tables of numbers.

In the 1980s *VisiCalc* was overtaken by another product, *Lotus 1-2-3*. This product added more functionality to the spreadsheet concept, allowing the user to draw graphs based on the numbers and to perform some elementary sorting and querying of the data just like a database package.

Since the advent of Windows 3.0 in June 1990, *Microsoft Excel* has become the predominant spreadsheet product.

The Anatomy Of An Excel Spreadsheet

Spreadsheets are just like electronic sheets of paper that have been ruled up into tables comprising of **columns** and **rows**. In *Excel*, each piece of ruled paper is referred to as a **worksheet** and it is actually made up of 16,384 **columns** across the screen, and 1,048,576 **rows** down the screen. If you hold a ruler up to the screen each column measures about 2.1 cm in width and about 0.5 cm in height.

The screenshot shows an Excel spreadsheet with the following data:

First Name	Last Name	Hourly Rate	Hours	Gross Pay
Margaret	Adams	15.50	24.00	372.00
John	Brown	16.75	16.20	271.35
Grace	Francis	18.00	12.00	216.00
Stephen	Simpson	9.65	27.50	265.38
Total			79.70	1,124.73
Average			19.93	281.18
Maximum			27.50	372.00
Minimum			12.00	216.00

Annotations in the image:

- Left side: "There are 1,048,576 rows down the screen labelled from 1 to 1,048,576" (with an arrow pointing to the row numbers on the left).
- Right side: "There are 16,384 columns across the screen labelled from A to XFD" (with an arrow pointing to the column letters at the top).
- Bottom left: "You can have as many worksheets in a workbook as your computer's memory will allow" (with an arrow pointing to the 'Sheet1' tab at the bottom).

In *Excel*, when you save your work it is saved in a file known as a **workbook**. A workbook is made up of one or more **worksheets** – you can have as many worksheets in a workbook as your computer memory will allow. Each worksheet is given a tab at the bottom of the screen with a **label** such as *Sheet1*, *Sheet2*, etc.

When a row and a column intersect you have a **cell**. Each cell can hold up to 32,767 characters (each character roughly equivalent to a letter or number – for example, the name *John* occupies 4 characters of space, one for each letter).

WHAT A SPREADSHEET CAN DO

Over the years the functionality of spreadsheets has increased. Today spreadsheets provide three main functions. Primarily they allow you to type numbers to perform calculations. They also

allow you to display those numbers pictorially as graphs. Finally, spreadsheets allow you to enter data into lists and to perform operations such as sorting, filtering, and summarising of those lists.

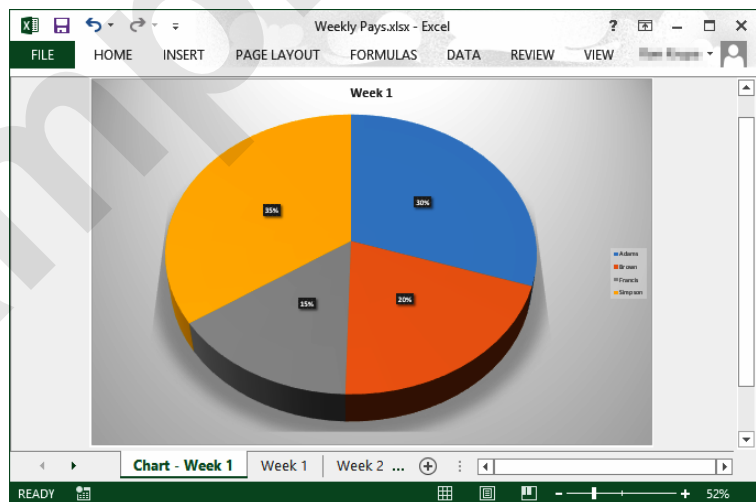
Performing Calculations

Spreadsheets are most commonly identified as applications that help you process numbers. Numbers are entered into cells and formulas that use these numbers are automatically and instantly recalculated. This is sometimes referred to as **numeric modelling**.

First Name	Last Name	Hourly Rate	Hours	Gross Pay
Margaret	Adams	15.50	24.00	372.00
John	Brown	16.75	16.20	271.35
Grace	Francis	18.00	12.00	216.00
Stephen	Simpson	9.65	27.50	265.38
		Total	79.70	1,124.73
		Average	19.93	281.18
		Maximum	27.50	372.00
		Minimum	12.00	216.00

Creating Graphs

Graphs, or **charts** as they are known in Excel, allow you to pictorially view the data in a worksheet. Charts are created based on one or more series of numbers that are in the worksheet. These numbers may have been typed or may appear as the result of a calculation. Like formulas, charts are automatically updated when the data in the worksheet changes.



Working With Lists

A list is simply a collection of items organised into columns and rows – and since that is how a worksheet is organised it is only logical that list-type operations can be performed. These operations include the ability to filter (search and display) specific data, the ability to sort the data either numerically or alphabetically, and the ability to summarise the data such as displaying the total of a particular column. Notice how this list has been sorted by *Hourly Rate* from largest to smallest.

First Name	Last Name	Department	Location	Hourly Rate
Helen	Davison	Management	Head Office	27.90
Julie	Moore	Sales	North Region	23.40
Michael	Shoo	Management	South Region	22.60
Bill	Abrams	Finance	Head Office	21.50
Debra	Barnes	Sales	East Region	18.60
Grace	Francis	Admin	Head Office	18.00
John	Brown	Sales	North Region	16.75
Betty	Bluster	Sales	East Region	16.70
Marty	Zammit	Sales	South Region	15.90
Margaret	Adams	Sales	Head Office	15.50
Jason	Blair	Sales	South Region	13.50
Montgomery	Jones	Admin	South Region	11.20
Stephen	Simpson	Finance	South Region	9.65

THE APPROPRIATENESS OF SPREADSHEETS

Basically spreadsheets can be used for virtually any task that uses numbers and needs to be calculated. While they initially gained momentum in the accounting professions, spreadsheets are

now used throughout the business community, in Government, manufacturing, science, and many other areas of industry.

Advantages Of Spreadsheets

There are millions of uses in the modern world for spreadsheet applications such as Microsoft Excel.

- **In Business and Government:** Spreadsheets are used for a diverse range of purposes, including budgeting, analyses of sales and costs, monthly reporting of sales and costs, financial modelling, loan recalculation and amortisation, petty cash, bank and credit card reconciliations, producing simple lists, producing charts and graphs for business presentations, and more.
- **In Industry:** Spreadsheets are used in manufacturing for estimating things such as materials, costs, and the like, and for analyses of data captured by manufacturing or scientific equipment. Other uses of spreadsheets include price lists and statistical analyses for quality control.
- **At Home:** Spreadsheets can be quite useful for things such as tracking personal finances, credit card and bank reconciliations, hobby and small business bookkeeping, asset registers, and the like. The lists functionality is perfect for keeping small lists (consisting of about several hundred lines) of things such as names and addresses, CD collections and wine collections. Spreadsheets can also be used for sporting clubs, hobby associations, and other groups or clubs where basic accounting and member records need to be kept.

Disadvantages Of Spreadsheets

Spreadsheets are probably the simplest of all of the personal computer applications to use. As a consequence some people tend to use spreadsheets for everything, including tasks that they are not designed for such as lengthy text documents.

Some of the pitfalls of working with spreadsheets include:

- **Capacity:** Spreadsheets are like electronic pieces of paper ruled into columns and rows that allow you to perform calculations. The piece of electronic paper that you work with, known as a *worksheet*, is very large. However, spreadsheets have one disadvantage – all of the worksheet must be loaded (or at least pass through) the computer's memory, known as RAM. So while a worksheet may appear to have the capacity to be very large, it actually needs to be kept relatively small in order to perform efficiently.
Having said this, there is no reason why you can't create a whole series of smaller workbooks that are linked together.
- **Text:** You shouldn't attempt to produce text-based documents such as a letter or a memo using a spreadsheet. Spreadsheets are designed to work with numbers and perform complex calculations, and are structured with cells in order to fulfil this purpose. Word processing programs such as Microsoft Word are a far better choice for a text document.
- **Database:** Spreadsheets are useful for producing and manipulating lists – providing they are kept small. However, some users create a list in a spreadsheet and then keep adding new data until there are too many entries for it to continue to be efficient. Usually lists of more than several hundred lines (sometimes known as *records*) are better placed into a database application such as Microsoft Access.

PRACTICE EXERCISE

Spreadsheets

Tasks:**Completed:**

Before starting this exercise you MUST have completed all of the topics in the chapter Spreadsheets...

- 1 In your own words what is a "spreadsheet"?
- 2 Spreadsheets are ruled up into tables comprising of what?
- 3 List the three main spreadsheet programs that have been developed since the mid-1970s.
- 4 List the three main things that can be done with Microsoft Excel.
- 5 List two possible uses for spreadsheets in business.
- 6 List two possible uses for spreadsheets in industry.
- 7 List two things that spreadsheets should not be used for.

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Files required for exercise:

None

Files/work created by student:

Photocopy of answer sheet (next page)

Exercise Completed:

☐

PRACTICE EXERCISE WORKSPACE

Spreadsheets

1 In your own words what is a “spreadsheet”?

2 Spreadsheets are ruled up into tables comprising of what?

3 List the three main spreadsheet programs that have been developed since the mid-1970s

1.	2.
<hr/>	
3.	
<hr/>	

4 List the three main things that can be done with Microsoft Excel.

1.	2.
<hr/>	
3.	
<hr/>	

5 List two possible uses for spreadsheets in business.

1.	2.
<hr/>	

6 List two possible uses for spreadsheets in industry.

1.	2.
<hr/>	

7 List two things that spreadsheets should not be used for.

1.	
<hr/>	
2.	
<hr/>	

Sample

CHAPTER 2

InFocus

GETTING TO KNOW EXCEL 2013

Microsoft Excel is a *spreadsheet* application that is usually part of a suite of Microsoft applications, known as **Microsoft Office**.

You can use Excel for all sorts of tasks involving numbers such as budgeting, sales analysis, forecasting, charting and graphing and much more. Excel is a tool used to perform calculations with numbers so virtually any task that requires calculation and number crunching can be setup and performed in Excel.

Before you leap into creating anything, it is worth taking some time to become familiar with the Excel environment and its features.

In this session you will:

- ✓ learn how to start **Excel** from the desktop in **Windows 8**
- ✓ gain an understanding of the **Excel Start** screen
- ✓ gain an understanding of the **Excel 2013** workbook screen
- ✓ gain an understanding of how **Excel** works
- ✓ learn how to use the ribbon to access commands
- ✓ learn how to use ribbon key tip badges
- ✓ learn how to show and collapse the ribbon
- ✓ gain an understanding of **Backstage** view in **Excel**
- ✓ learn how to access the **Backstage** view
- ✓ learn how to use shortcut menus
- ✓ gain an understanding of how dialog boxes work
- ✓ learn how to launch a dialog box
- ✓ gain an understanding of the **Quick Access Toolbar**
- ✓ learn how to add commands to the **Quick Access Toolbar**
- ✓ gain an understanding of the status bar
- ✓ learn how to exit correctly and safely from **Excel**.

STARTING EXCEL FROM THE DESKTOP

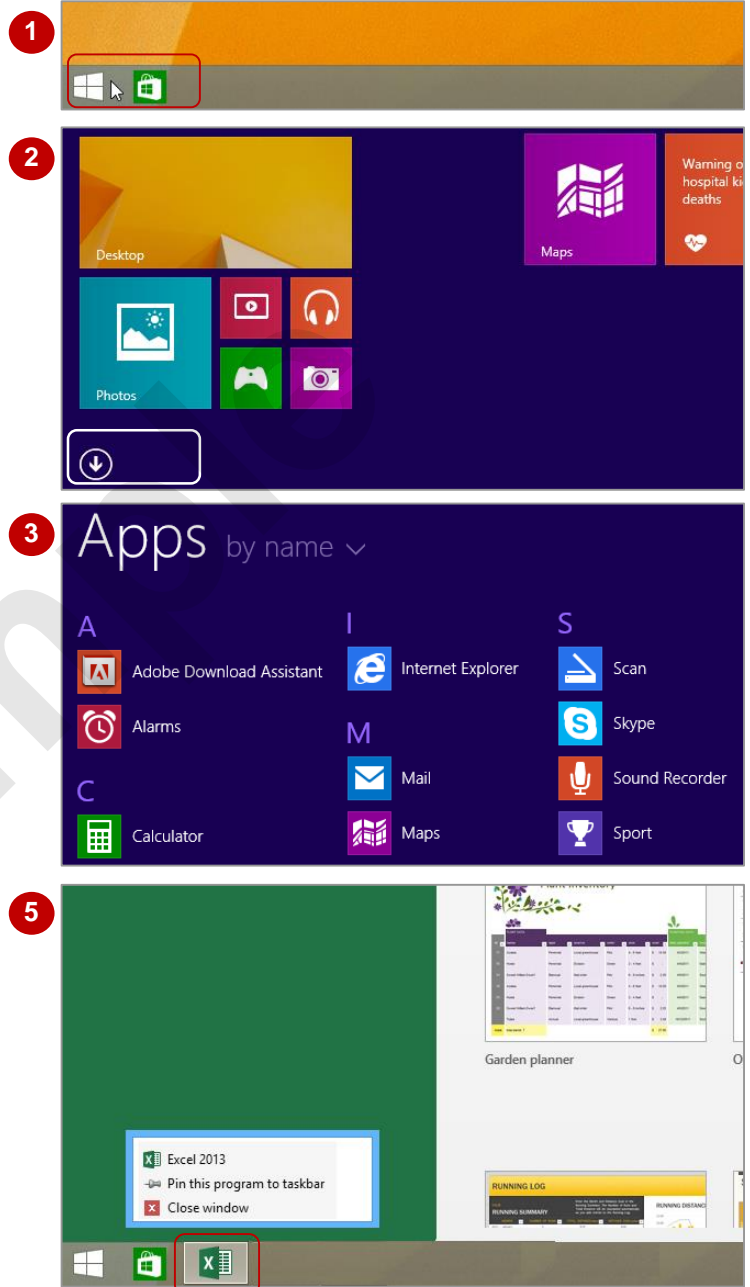
To create or edit a workbook, the first thing you must do is start Excel. If your computer uses Windows 8.1 it will default to either the desktop or the **Windows Start** screen, depending on the

technology you are using. If the desktop appears by default, you may need to access the **Windows Start** screen to open Excel, unless you have previously created a shortcut icon on the desktop.

Try This Yourself:

Before you begin, ensure that your computer is switched on and the desktop is displayed...

- 1 If there is no **Excel** icon in the taskbar at the bottom of the desktop, click on the **Windows** icon in the taskbar, as shown, to display the **Start** screen
- 2 Move the mouse pointer to display the white **down arrow** icon in the bottom left corner of the **Start** screen, as shown
- 3 Click on the white arrow to display the **Apps** view
From here you can view all of your apps, including Excel...
- 4 Locate the **Microsoft Office 2013** apps, then click on **Excel 2013** to open Excel with the Excel **Start** screen displayed
- 5 Right-click on the Excel icon in the taskbar to display a menu of options, as shown, then select **Pin this program to taskbar**
You can now click on this icon to open Excel from the desktop. This icon will remain in the taskbar unless you remove it...
- 6 Repeat step 5 to select **Close window** to close Excel
- 7 Click on the Excel icon in the taskbar to open **Excel** again



For Your Reference...

To **add** an **Excel icon** to the **desktop taskbar**:

1. From the **Windows Start** screen, click on the white down arrow icon to display the **Apps** view
2. Right-click on **Excel 2013**
3. Select **Pin to taskbar**

Handy to Know...

- If your computer displays the **Start** screen, rather than the desktop by default, you can type the name of the application you wish to open directly into the **Start** screen to display the **Search** pane, then simply click on the application's name that appears in the **Search** pane.

UNDERSTANDING THE EXCEL START SCREEN

Unless you start Excel with a specific data file, **Excel 2013** will open with the Excel **start** screen displayed. This acts as a gateway into Excel and from this initial screen you can choose what kind

of workbook you want to work with. You can choose to work with a recent file, open an existing file, or create a new file using the available templates.

The Excel 2013 Start Screen

In Microsoft Excel your data is stored in a file referred to as a workbook.

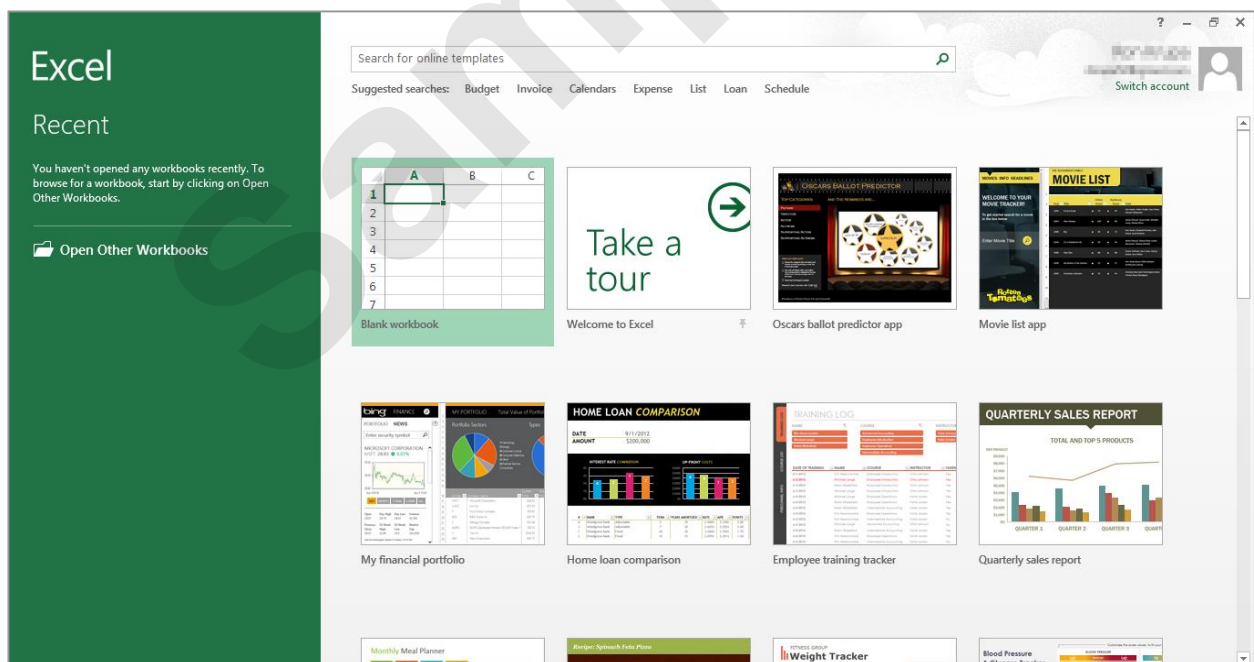
The Excel 2013 start screen is very helpful if you want to quickly access files you have worked on recently or create a new workbook file based on one of the available templates (including the default Blank workbook template). It acts as a gateway into the program.

If you have already worked on workbooks, a list of recent files will display below **Recent** in the green pane to the left of the screen. If you haven't worked on any workbooks yet you can open existing files by clicking on **Open Other Documents** (below **Recent** in the left green pane). This allows you to open an existing workbook file from your computer or **OneDrive**.

The right side of the start screen displays thumbnail previews of available templates you can use to create a new workbook. It also contains the **Search for online templates** box, which you can use to search the internet for additional templates.

Templates are simply layouts that have already been created which you can customise to suit your needs and then enter relevant data. If you want to start with a clean slate you can choose the **Blank workbook** template – you'll probably find this is the one you'll use the most.

In the top right corner of the start screen you'll see information about the account you've used to sign into Windows, as well as commands such as **Microsoft Excel Help**, **Minimise**, **Restore Down** (or **Maximise**) and **Close**.



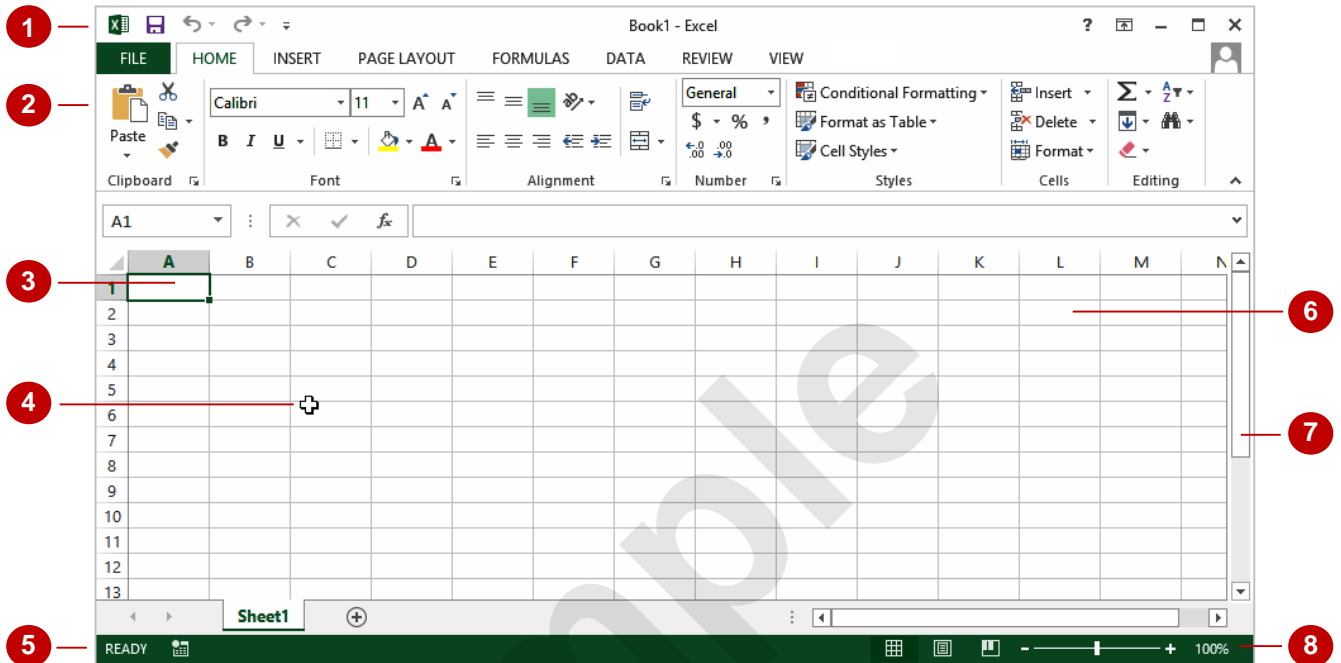
The **start** screen will only display when you launch the **Excel 2013** application directly – that is, by clicking on an Excel tile on the **Windows 8 Start** screen, clicking on the application on the **Apps** screen or under search results, or clicking on the taskbar icon if the application has been pinned to the desktop taskbar.

Excel 2013 can also be started in **Windows 8** by double-clicking on a workbook file in the **File Explorer**. When this occurs **Excel 2013** will bypass the **start** screen shown above and open the workbook directly.

THE EXCEL WORKBOOK SCREEN

The **Excel** screen is made up of several key components which are described on this page. Some of these components, such as the **ribbon** and **Backstage** view, are common to all other

Office 2013 applications so once you know how they work you won't have to relearn them when you use other applications.



- 1 The **FILE** tab is used to access the **Backstage** view which contains file management functions, such as saving, opening, closing, printing, sharing, and so on. There is also information contained here such as your document **Properties**. **Options** are also available so that you can set your working preferences for Excel.
- 2 The **ribbon** is the tabbed band that appears across the top of the window. It is the control centre of Excel. You use the **tabs** on the ribbon to access the **commands** that are categorised into **groups**.
- 3 The **active cell** is where text, numbers, and formulas will appear when you start typing.
- 4 The **mouse pointer** is used, amongst other things, to select a cell and make it active. It may appear as a large cross, as in this example, as an I-bar, or any number of other forms, depending upon its function at that position on the screen.
- 5 The **status bar** appears across the bottom of the window and displays useful information about what is happening in the worksheet. At present it shows **Ready** which means that Excel is ready to be used for your project.
- 6 The **worksheet** is like an electronic piece of paper ruled into columns and rows. The worksheet is where you type numbers, letters, and formulas to perform calculations. Notice that columns are headed using letters of the alphabet (A, B, C, etc) while rows are designated using numbers down the left side.
- 7 The **scroll bar** indicates your current position in the worksheet and lets you move to other positions in the worksheet by clicking or dragging. The arrows can also be used to move through the worksheet.
- 8 The **View** buttons and the **Zoom Slider** are used to change the view or to increase/decrease the zoom ratio for your worksheet.