DATA MANAGEMENT2
Ms. EXCEL TRAINING

23rd to 25th February 2014

NORPLAN

Organised By:

NORPLAN/MRRD

Presented By:
Atta Mohammad Mutmaeen

INTRODUCTION TO Ms. EXCEL

1st DAY SESSION

(23 February 2014)

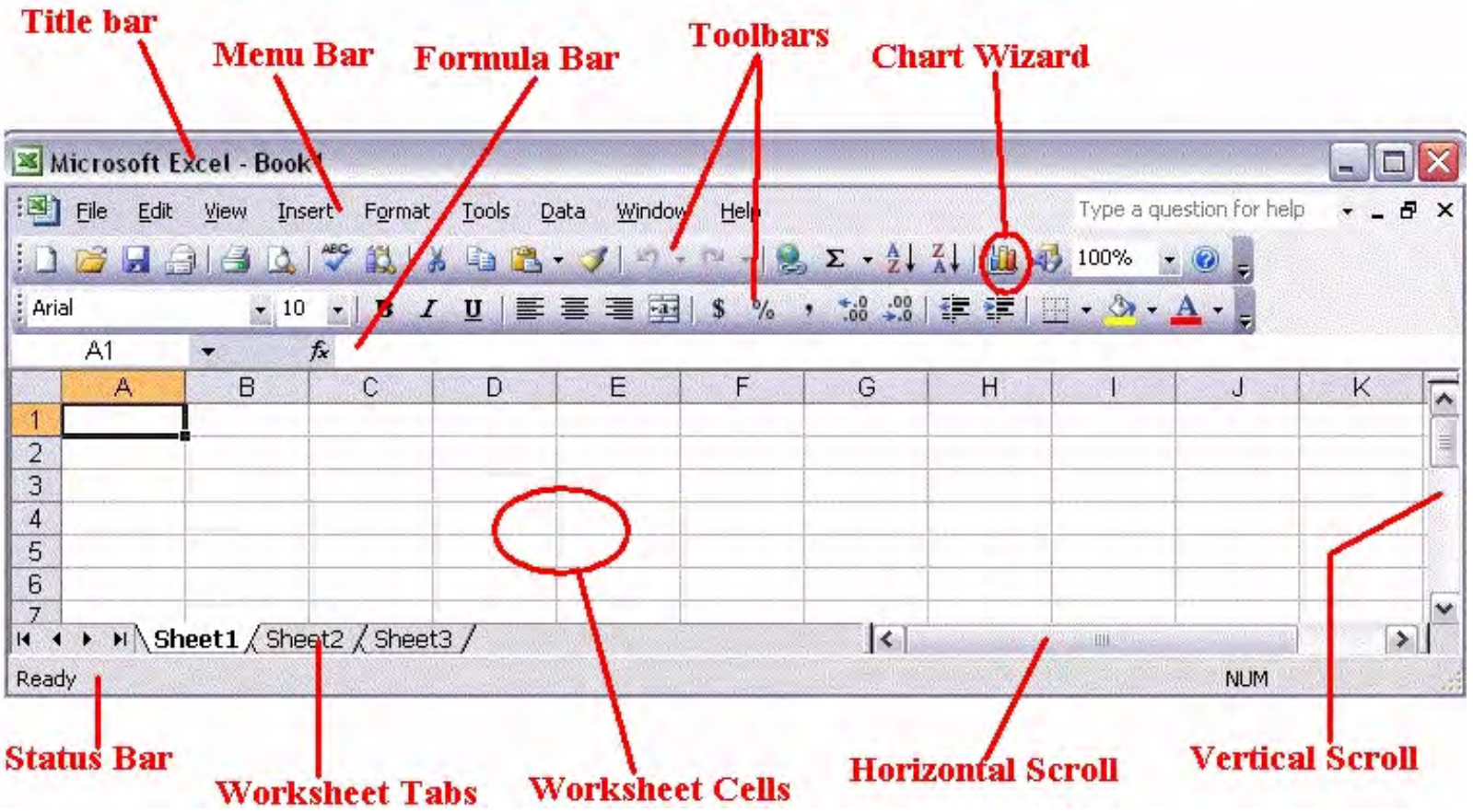
1.1. OUTLINE

1.1. OUTLINE
1.2. INTRODUCTION
1.3. DATA ENETRY
1.4. COLUMNS/ROWS/CELL
1.5. CELL SELECTION
1.6. ADVANCED FORMATTING

1.2. INRODUCTION
1.2.1. WHAT IS A SPREADSHEET?

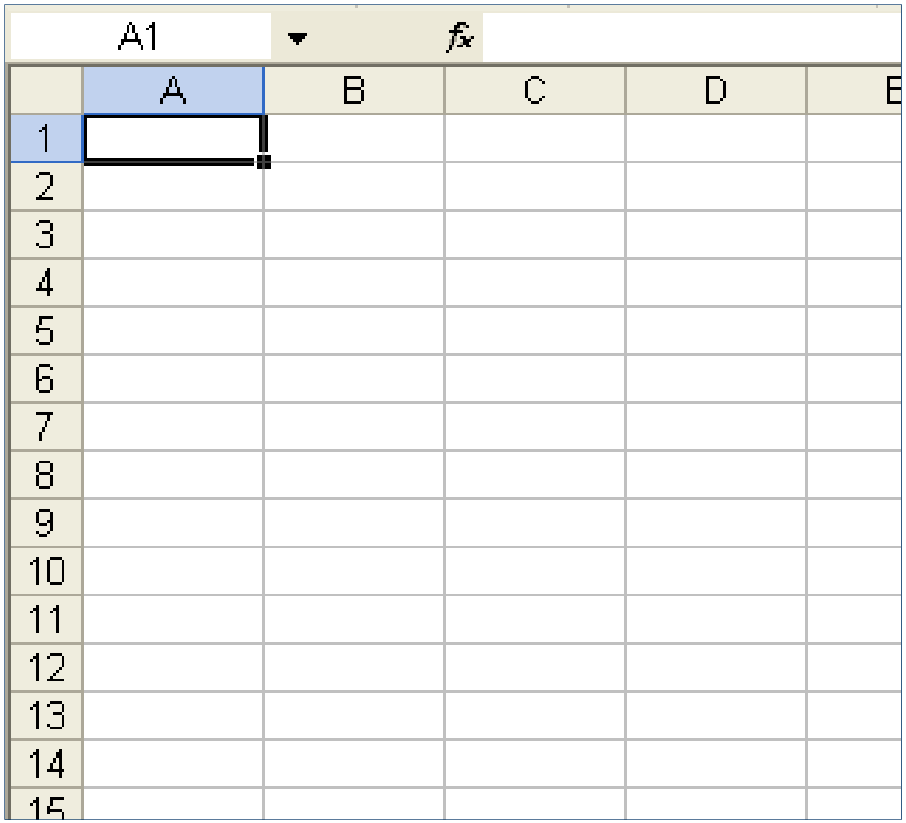
- A spreadsheet is basically a table containing NUMERICAL and/or ALPHANUMERICAL values.
- Individual elements are known as CELLS.
- Each CELL can contain a single value or a STRING (sequence of characters)
- The cells are arranged in columns and rows are referenced by a CELL ADDRESS (For example, B3 refers to the cell in COLUMN B, row 3.
- The collection of cells is referred to as a WORKSHEET.
- A cell can have a manually entered number or be assigned a FORMULA EVALUATION such as C7 being =(C3+C4+C5)

1.2. INRODUCTION
1.2.2. THE EXCEL WINDOW



1.2. INRODUCTION
1.2.3. WORKSHEET

- Excel's main screen is called a "***worksheet***".
- Each worksheet is comprised of many boxes, called "***cells***".

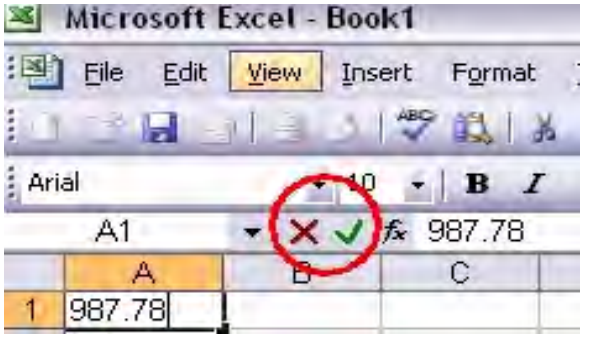


1.3. DATA ENETRY
1.3.1. TEXT AND NUMBER

There are two ways to enter data into Excel

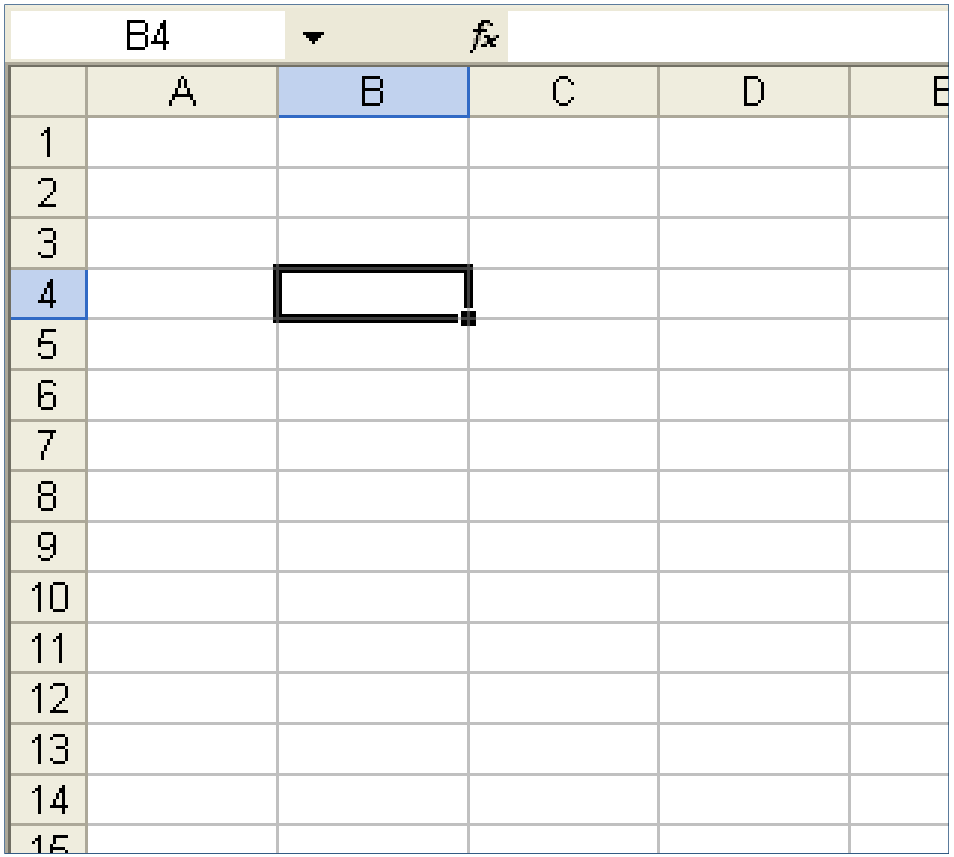
- A simple numerical value called a number constant.
- A string, called a text constant.

When you are finished entering a number in a cell hit ENTER or click the “checkmark”.



1.3. DATA ENETRY
1.3.2. SELECTING A CELL

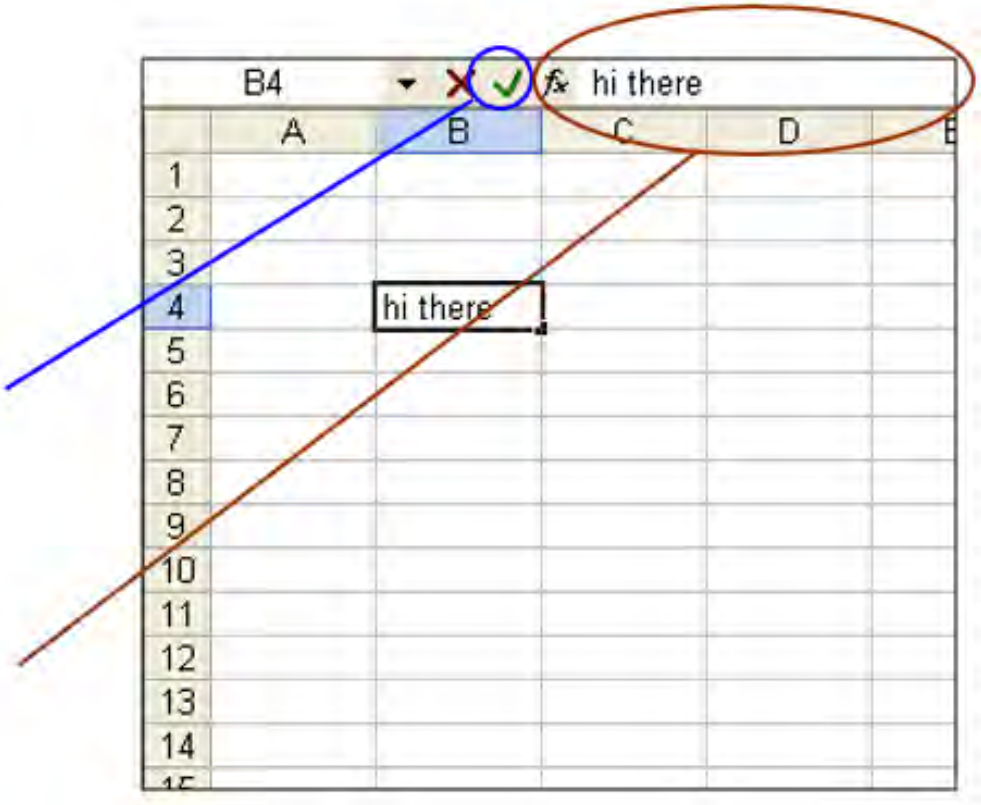
- "***Select***" a cell by clicking on it once (don't double click).
- You can ***move*** from cell to cell with the ***arrow keys*** or by pressing the "***Enter***" key.



1.3. DATA ENETRY

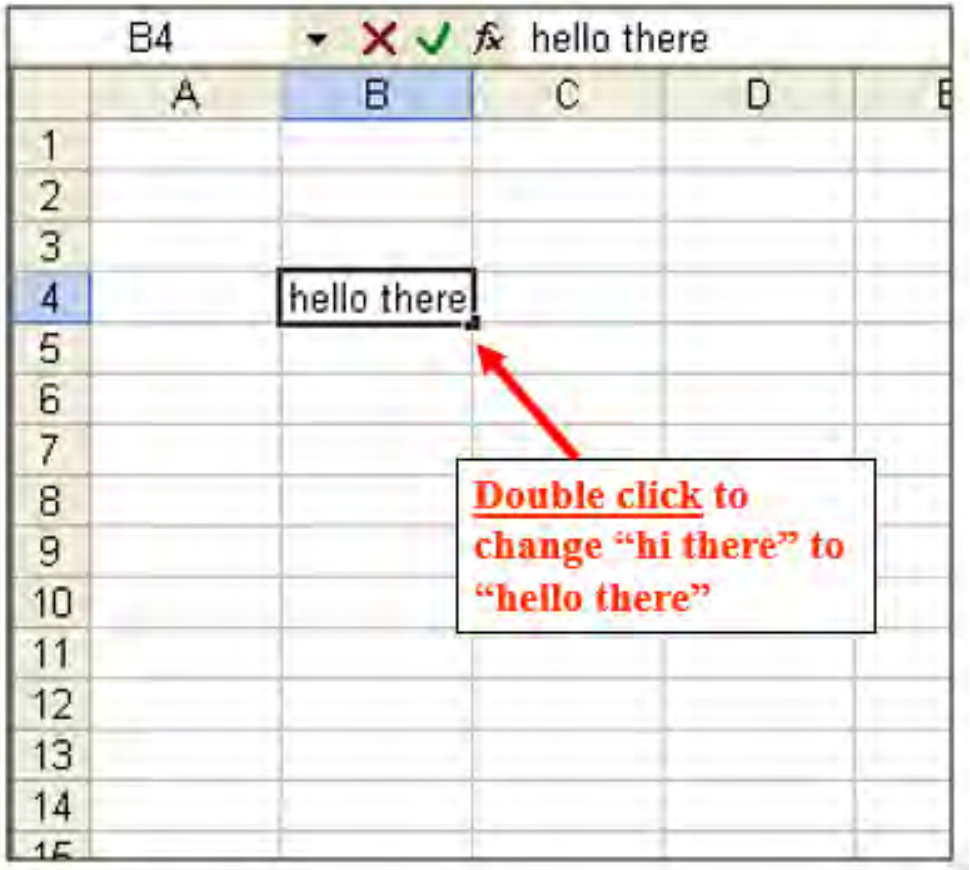
1.3.3. ENTERING INFROMATION / THE FORMULA BAR

- To enter information in a cell, just start typing.
- When you are done either
  - Press the **Enter Key**
  - Press an **arrow key**
  - Click on the "**check button**" (only visible when entering data into a cell)
- The information in the selected cell is also displayed in the "**formula bar**" above the worksheet.



1.3. DATA ENETRY
1.3.4. DOUBLE CLICK TO MODIFY A CELL

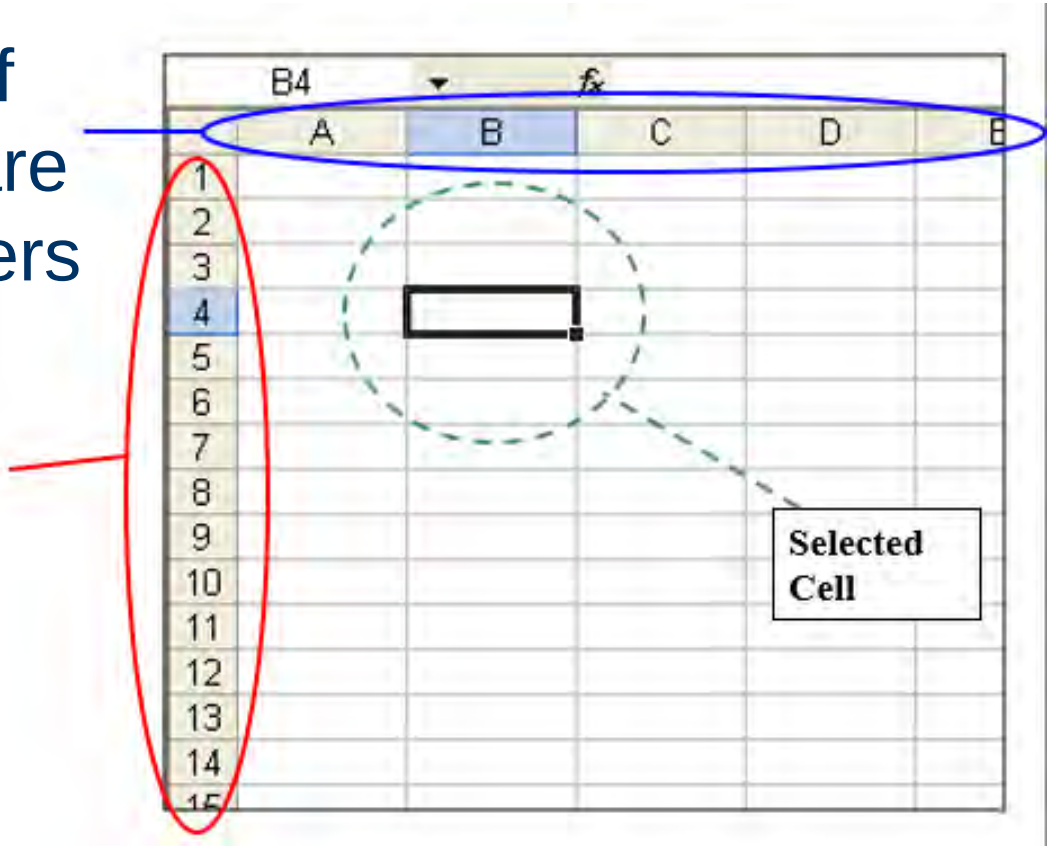
- To modify the contents of a cell **Double Click** on the cell.
- Then use the **Right, Left** arrow keys and the Insert and Delete keys to modify the data.
- When you are done:
  - Press the **Enter Key**
    or
  - Click on the check box.



1.4. COLUMNS/ROWS/CELL

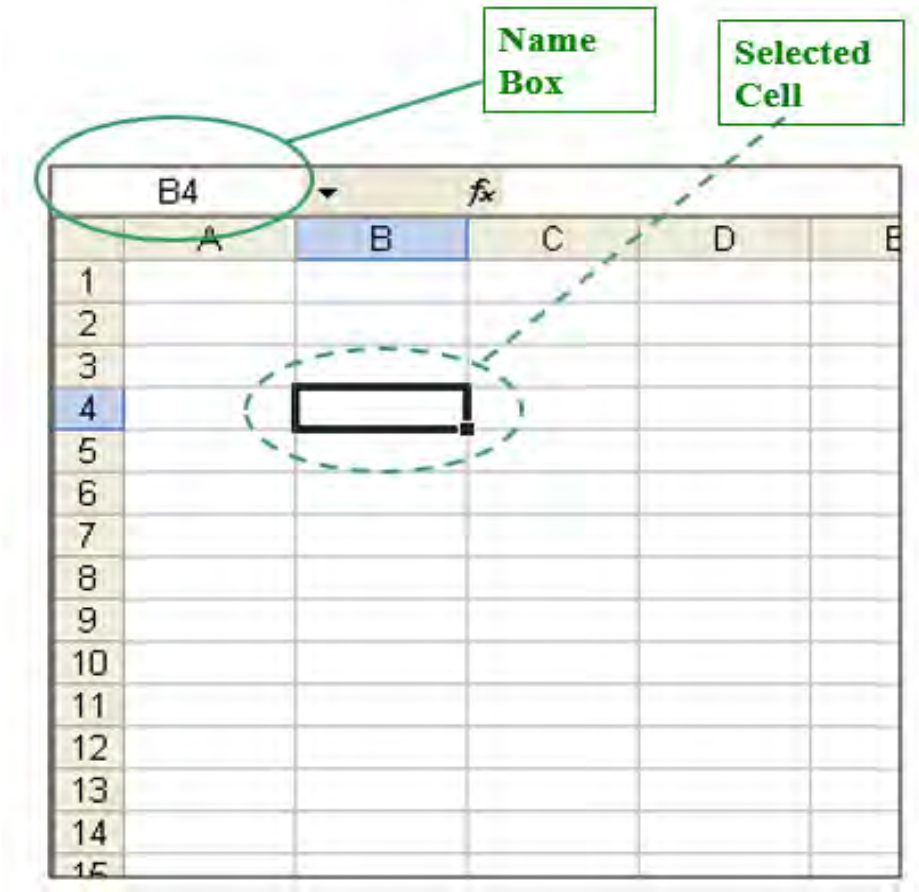
1.4.1. COLUMN NAMES (letters) & ROW NAMES (numbers)

- The **columns** of the worksheet are named with letters
- The **rows** are named with numbers



1.4. COLUMNS/ROWS/CELL
1.4.2. CELL NAMES (ex. B4)

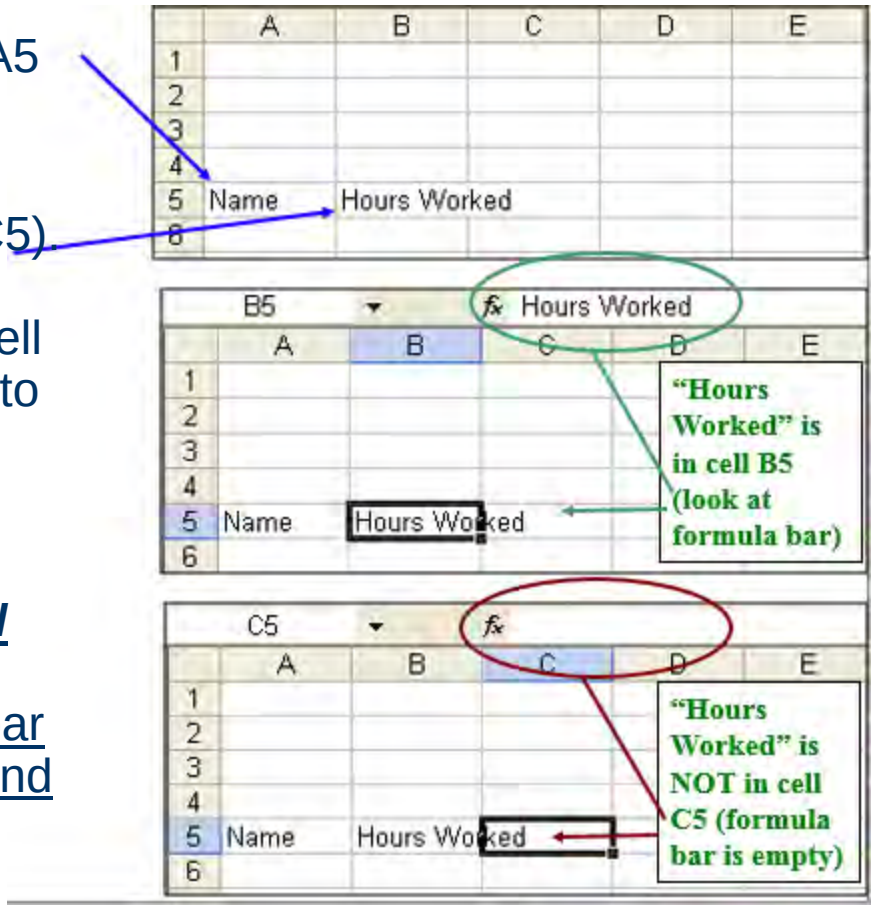
- The name of a cell is a combination of the **Letter Of The Column** that the cell is in followed by the **Number Of The Row** that the cell is in.
- Example: the selected cell in the picture is named **B4** *(NOT 4B)*
- Excel automatically shows the name of the **currently selected cell** in the "**name box**" (located above the worksheet).
- The letter ***must*** come first (i.e. B4, NOT 4B) and there may NOT be any spaces between the letter and the number.
- We will learn later why it is important to understand how to name cells.



1.4. COLUMNS/ROWS/CELL

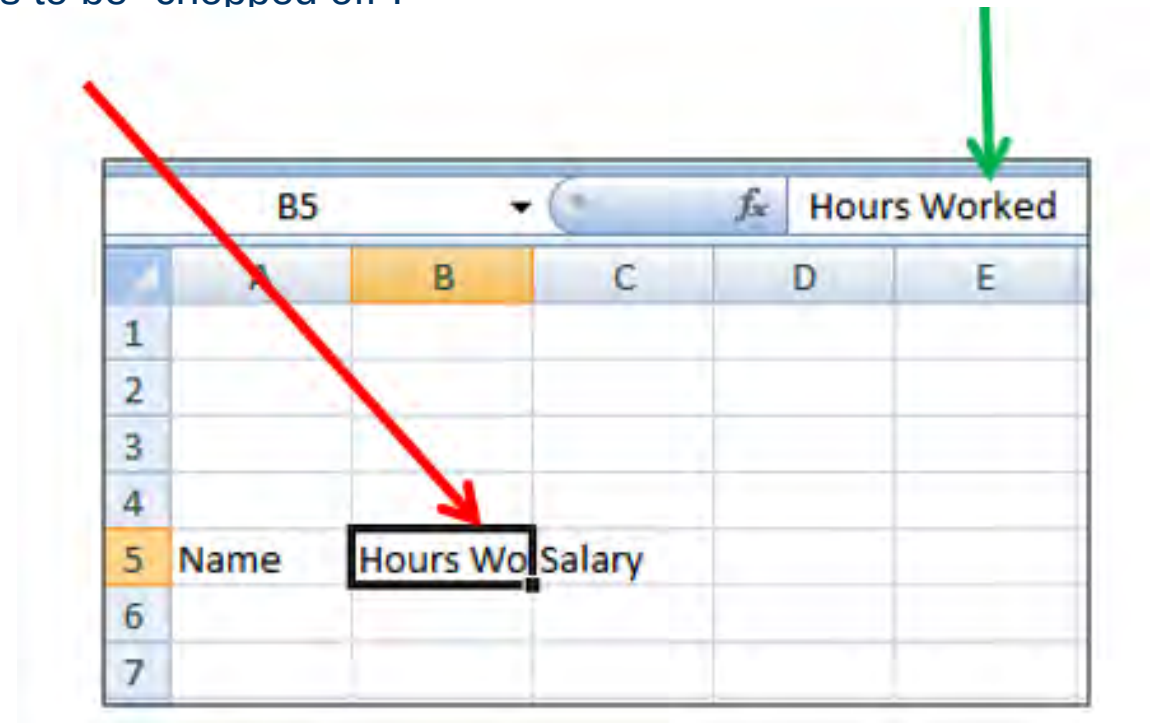
1.4.3. INFORMATION THAT IS “too wide” FOR A CELL

- The word “Name” is in cell A5
- The words “Hours Worked” are in cell **B5** (NOT in cell C5). However, since the information is too wide for cell B5, it looks like it extends into cell C5.
- You can determine that the information is **really only *IN* cell B5** by selecting cell B5 and looking at the formula bar and then selecting cell C5 and looking at the formula bar.



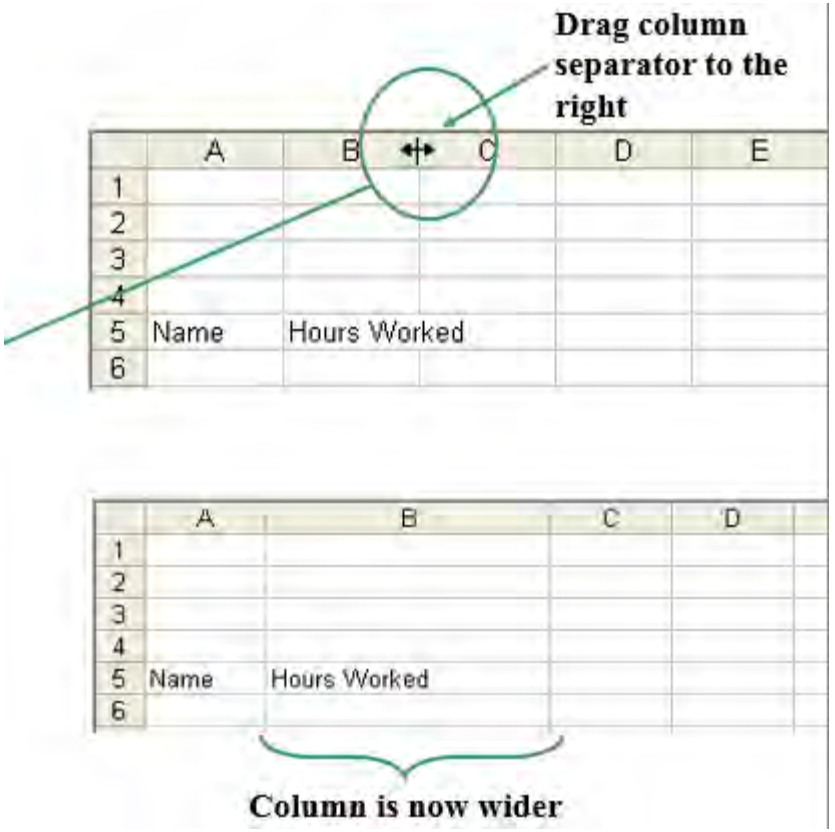
1.4. COLUMNS/ROWS/CELL
1.4.4. INFORMATION THAT IS “Chopped Off”

- If there is information in the cell to the right, then the original cell still contains all of the data, but the data appears to be “chopped off”.
- You can see the complete data by selecting the cell and looking in the formula bar.



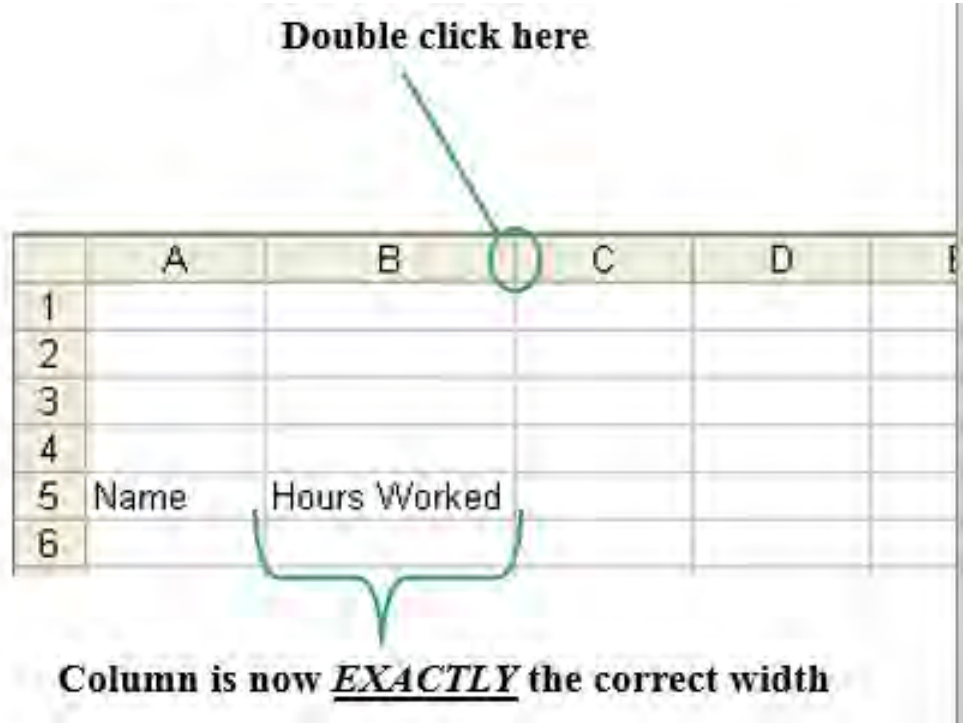
1.4. COLUMNS/ROWS/CELL
1.4.5. MAKE A COLUMN WIDER

- To make Column B wider, point the cursor to the column separator between columns B and column C.
- The cursor changes to a “Double headed arrow”.
- Now, click the left mouse button and without letting go of the button, drag the separator to the right to make the column wider (or to the left to make the column narrower).



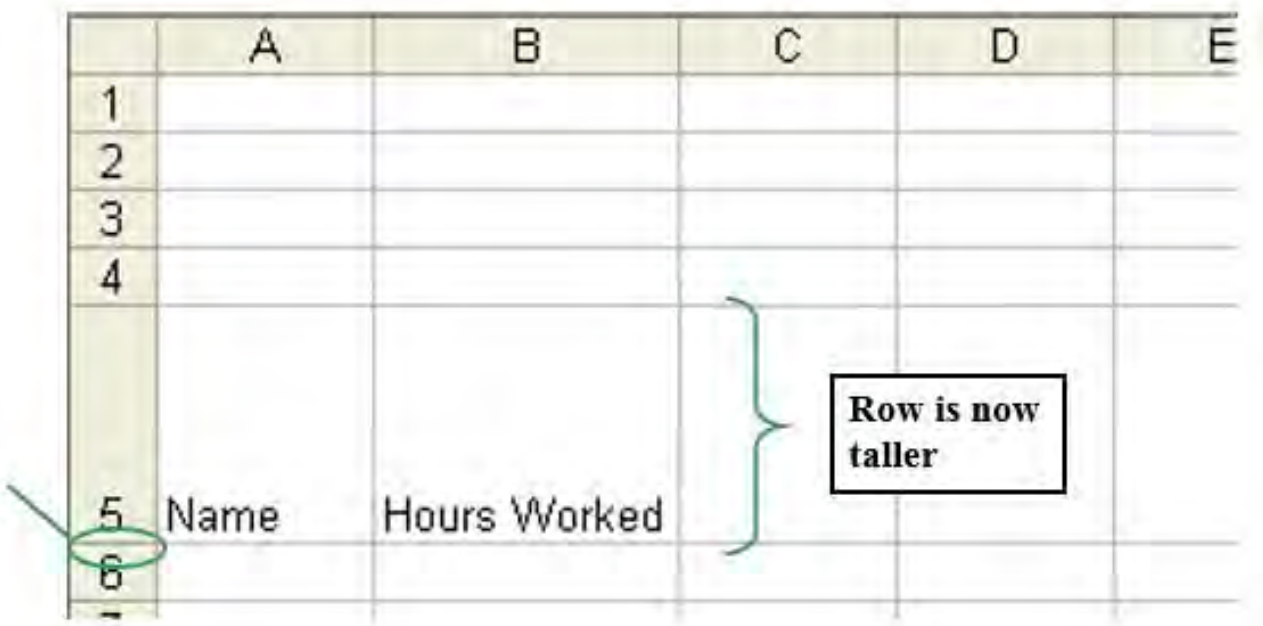
1.4. COLUMNS/ROWS/CELL
1.4.6. GETTING THE EXACT WIDTH

- To get the “exact” width, double click on the separator instead of dragging it.



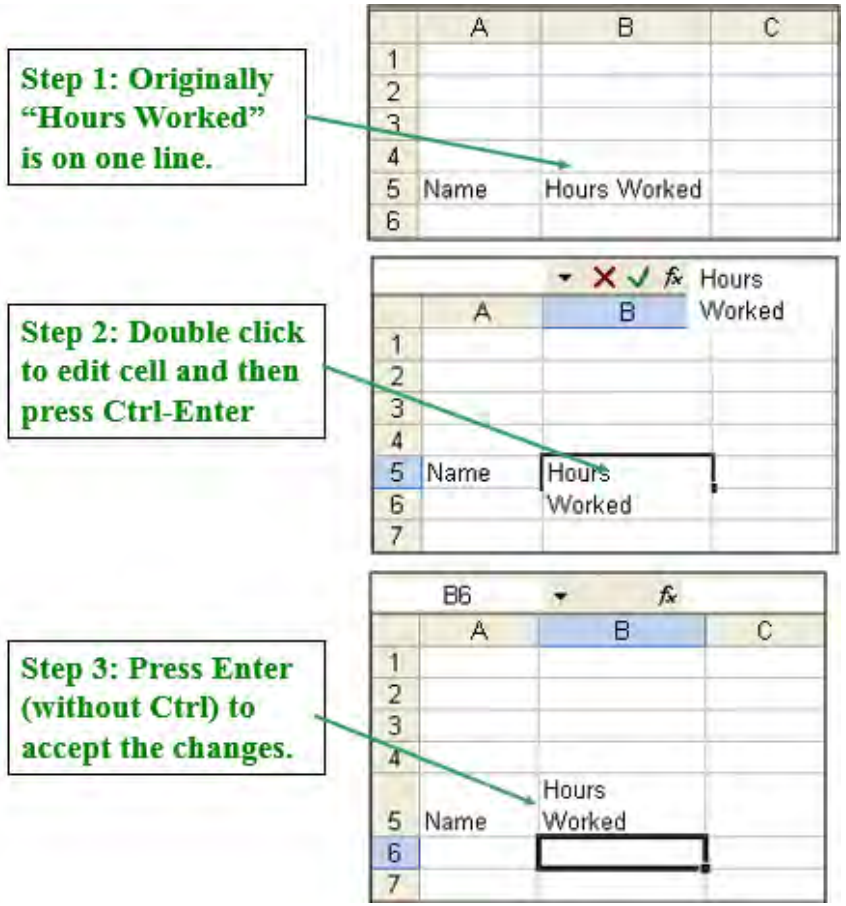
1.4. COLUMNS/ROWS/CELL
1.4.7. RESIZING A ROW

- Make a row taller or shorter by dragging the separator between the rows.
- Click and drag here to resize row 5.



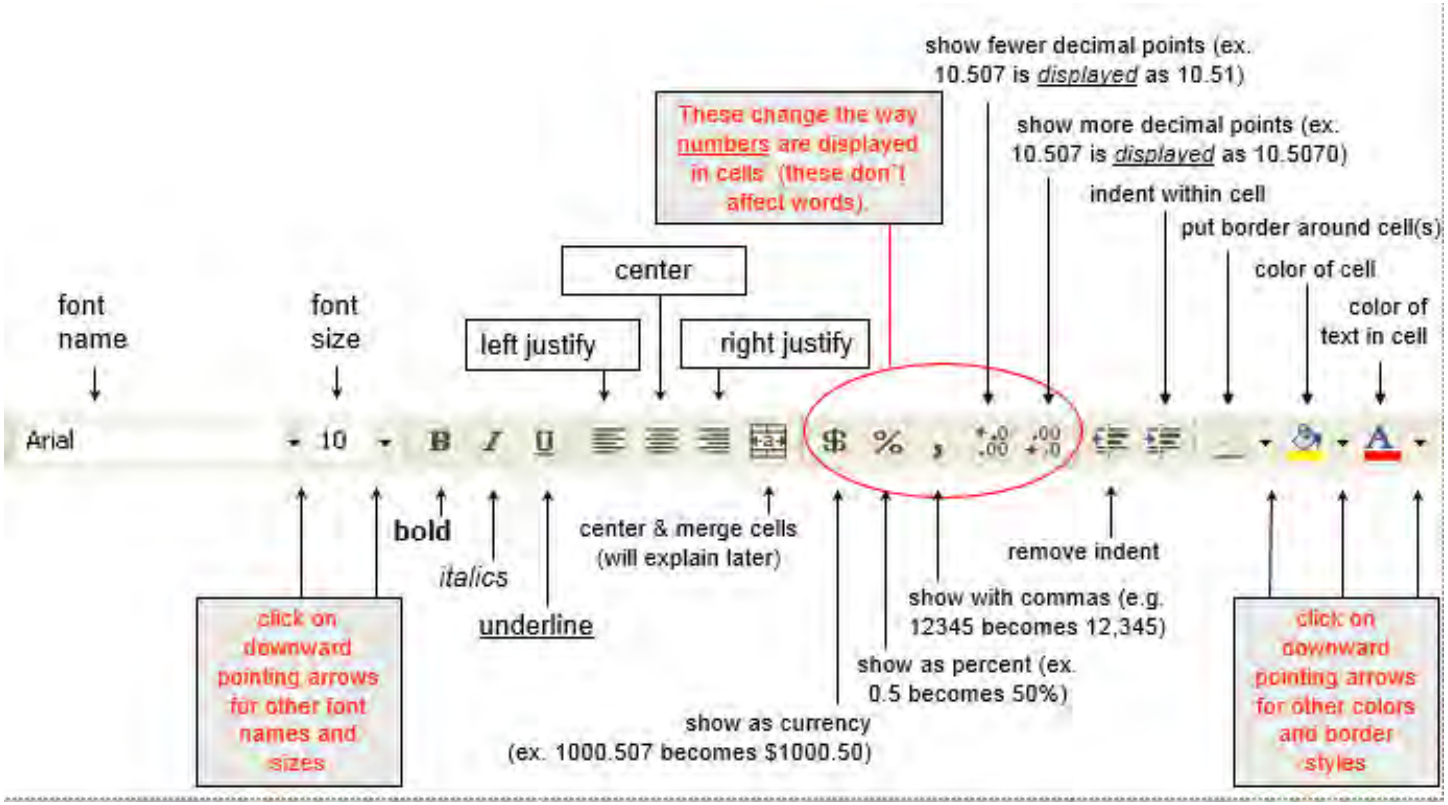
1.4. COLUMNS/ROWS/CELL
1.4.8. PUTTING AN “Enter” INSIDE A CELL

- To add a new line inside a cell
  - Double click inside the cell where you want the new line.
  - Press Alt+Enter (i.e. hold down the Alt key and press Enter while still holding down Alt).
  - When you are done editing, press Enter (without holding down Alt) to accept the changes.



1.4. COLUMNS/ROWS/CELL
1.4.9. FOMRATTING CELLS

- Select **one or more cells** and then click on any of the formatting buttons (see below) to change the formatting of the **selected cells** and Formatting buttons:



EXAMPLE 1.1:
EXAMPLE- UNFORMATTED WORKSHEET

Unformatted Worksheet, see the next slide for formatting

	A	B	C	D
1	Payroll			
2	From	6/1/2008		
3	To	6/7/2008		
4				
5	Employee Name	Hours Worked	Salary Per Hour	Paycheck
6	Sue	40	15	$ 600.00
7	Joe	20	10	$ 200.00
8	Meg	30	20	$ 600.00
9	Abe	40	14	$ 560.00
10				
11	Total			$1,960.00

EXAMPLE 1.1 CONT'D:
MAKING CELLS BOLD

- Click on cell A1 and drag to cell A3.
- Then press the Bold button to make cells A1,A2,A3 bold.
- You could also press the font or background color buttons to change the color or apply any other formatting you like (this is not shown below).

	A	B	C	D
1	**Payroll**			
2	**From**	6/1/2008		
3	**To**	6/7/2008		
4				
5	Employee Name	Hours Worked	Salary Per Hour	Paycheck
6	Sue	40	15	$ 600.00
7	Joe	20	10	$ 200.00
8	Meg	30	20	$ 600.00
9	Abe	40	14	$ 560.00
10				
11	Total			$1,960.00

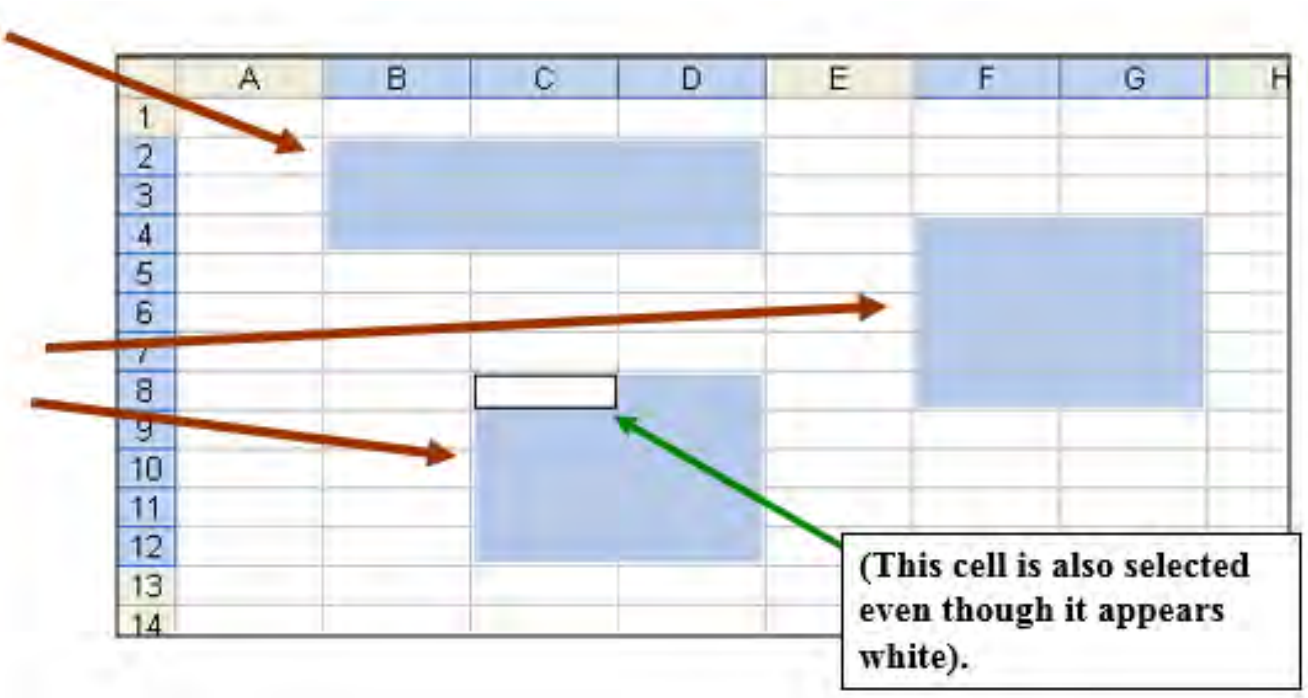
1.5. CELL SELECTION
1.5.1. SELECTING MORE THAN ONE CELL

- To select a large range of cells, click on the upper left cell in the range. Then hold the shift key and click on the lower right cell in the range.

- You can select different “non-contiguous” areas of cells by holding down the Ctrl key while clicking and dragging.

1.5. CELL SELECTION
1.5.2. SELECTING NON-CONTIGUOUS RANGES

- Click and drag to select the first range.
- Ctrl-click and drag to select additional ranges



1.5. CELL SELECTION

1.5.3. SELECTING ENTIRE ROWS, COLUMN OR ALL CELLS ON THE WORKSHEET

- To select an entire column, click on the letter for the column header. To select several columns, click on the header for the first column and drag to the right.
- To select an entire row, click on the number for the row header. To select several rows, click on the header for the first row and drag down.
- To select all of the cells on the spreadsheet, click on the upper left hand corner of the spreadsheet (where the column headers meet the row headers)

1.5. CELL SELECTION

1.5.3. SELECTING ENTIRE ROWS, COLUMN OR ALL CELLS ON THE WORKSHEET Cont'd

To select ENTIRE COLUMN B

click on "B" column header

To select COLUMNS B,C,D

click on "B" column header and drag to right

To select COLUMNS B,C and F,G,H

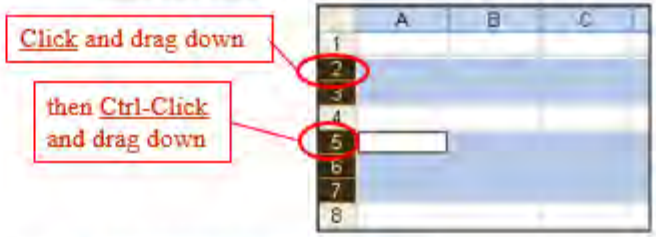
- click on "B" column header, drag to right,
- then Ctrl-Click on "F" column header and drag right

To select ENTIRE ROW 2

click on "2" row header

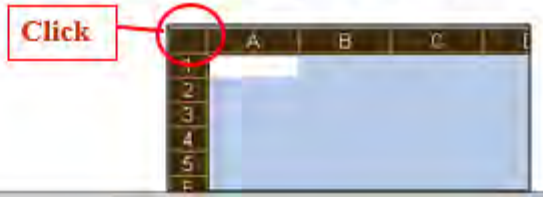
To select ROWS 2,3 and 5,6,7

- click on "2" row header, drag down,
- then Ctrl-Click on "5" row header and drag down



To select ENTIRE WORKSHEET

click on select worksheet button
(in corner between "1" and "A" buttons)



EXAMPLE 1.2:
CONTINUED FROM EXAMPLE 1.1

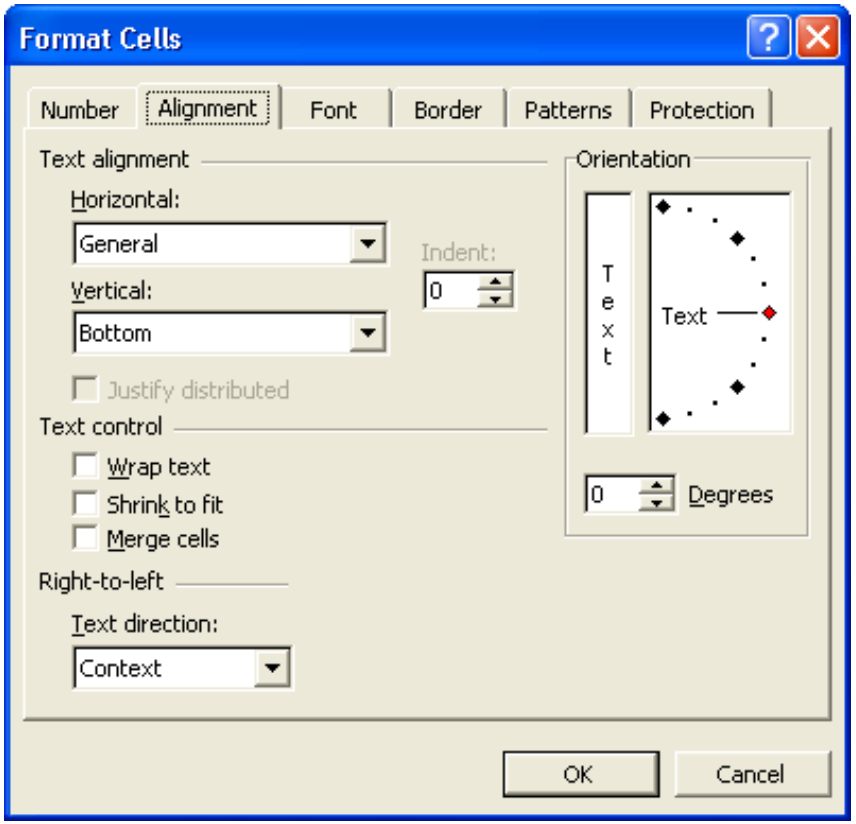
- **Step 1:** Click on row header for row 5
- **Step 2:** Ctrl-click on row-header for row 11
- **Step 3:** Press Bold button or type ctrl-b
- **Note:** After being "bolded", the word "Employee" is now too wide for the column, so make the column wider if necessary (this step is not shown).

	A	B	C	D	E	F
1	**Payroll**					
2	**From**	6/1/2008				
3	**To**	6/7/2008				
4						
5	**Employee Name**	**Hours Worked**	**Salary Per Hour**	**Paycheck**		
6	Sue	40	15	$ 600.00		
7	Joe	20	10	$ 200.00		
8	Meg	30	20	$ 600.00		
9	Abe	40	14	$ 560.00		
10						
11	**Total**			**$1,960.00**		
12						

1.6. ADVANCED FORMATTING

1.6.1. THE FORMATTING CHANGES HOW THINGS LOOK, not HOW THEY WORK

- Using the formatting buttons only give you a limited amount of formatting ability.
- For more formatting ability, select one or more cells and right click on the selection. Then choose “format cells” from the popup menu.
- Choose options from the Number, Alignment, Font, Border and Patterns tabs and press OK to change the way your information looks on the screen.
- The Protection tab is used to lock cells so that their contents can’t be modified.
- We will not go into the details of using the format cells dialog box at this time but you should be able to figure out most of it by yourself.



1.6. ADVANCED FORMATTING

1.6.1. THE FORMATTING CHANGES HOW THINGS LOOK, not HOW THEY WORK Cont'd

- NOTE: you will probably not understand this slide until after you learn about Excel Formulas. Formulas are covered later in this presentation.
- When you change the format of a cell, Excel still "remembers" the original value.
- Excel will use the un-formatted value when calculating formula values.
- Example: if you change numbers to appear with fewer decimal points the original number with all of its decimal points are used in calculations.

Ms. EXCEL FORMULAS

2nd DAY SESSION

(24 February 2014)

2.1. OUTLINE

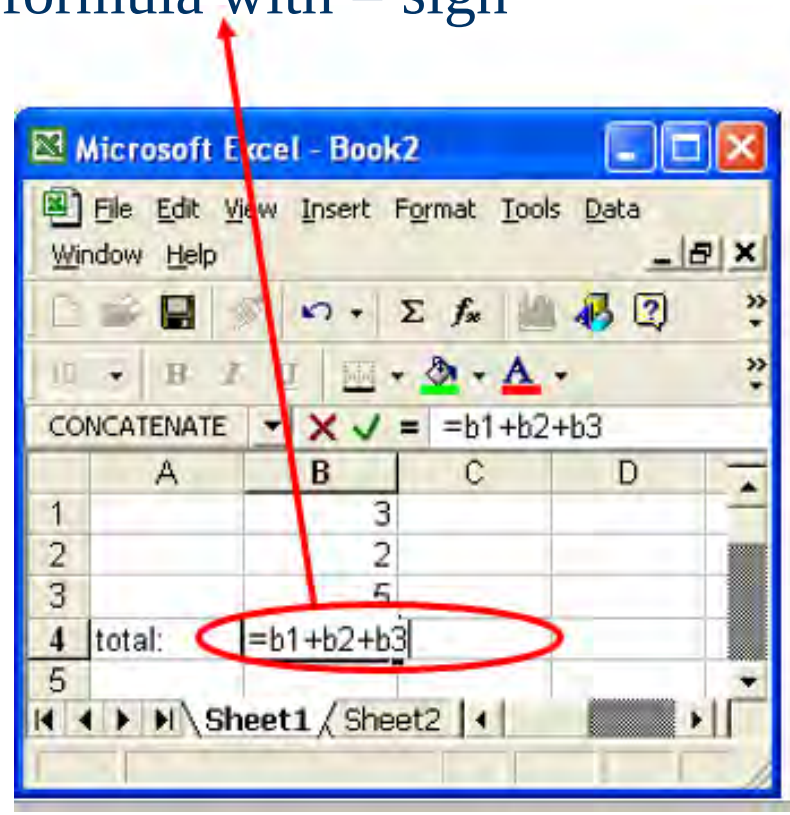
2.1. EXCEL FORMULAS
2.2. FUNCTION
2.3. OTHER FUNCTIONS
2.4. FUNCTION EDITOR
2.5. CELLS REFERCENCES
2.6. TEXT / STRING / CHARACTER
2.7. CONCATENATION
2.8. LOWER & UPPER FUNCTION
2.9. LEN FUNCTION
2.10. TRUE AND FALSE
2.11. LOGICAL FUNCTION

2.1. EXCEL FORMULAS

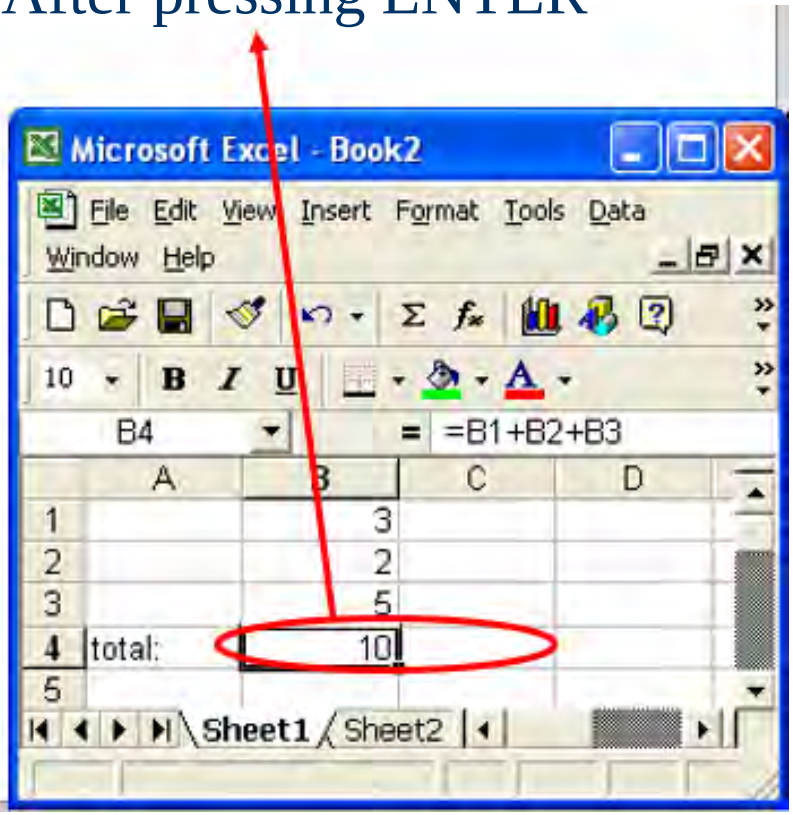
- You must have an equals sign (=) as the first character in a cell that contains a formula.
- The = sign tells excel that the contents of the cell is a formula
- Without the = sign, the formula will not calculate anything. It will simply display the text of the formula.

2.1. EXCEL FORMULAS
2.1.1. EXCEL FORMULA CORRECTION

formula with = sign

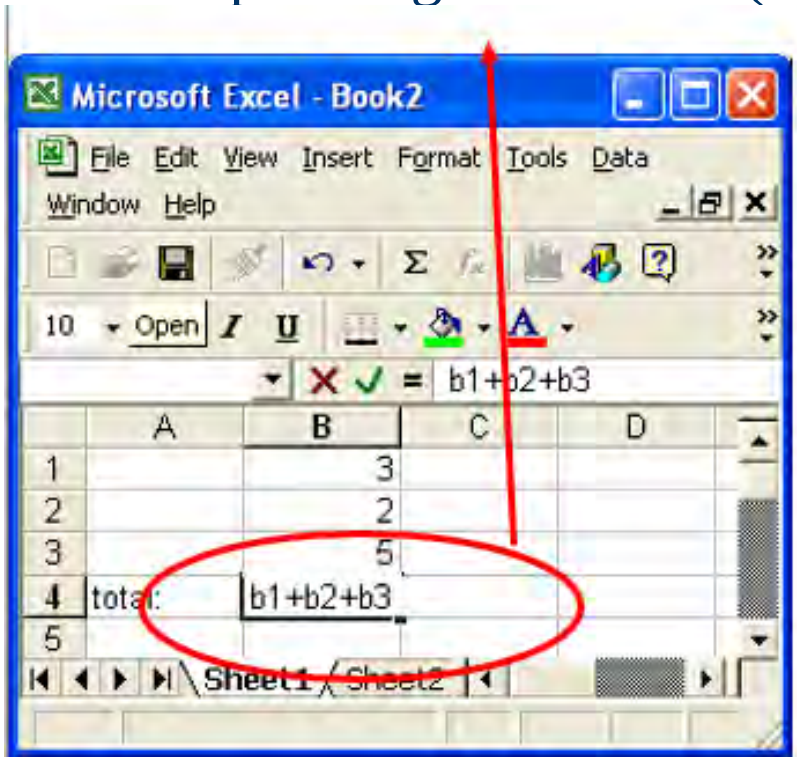


After pressing ENTER

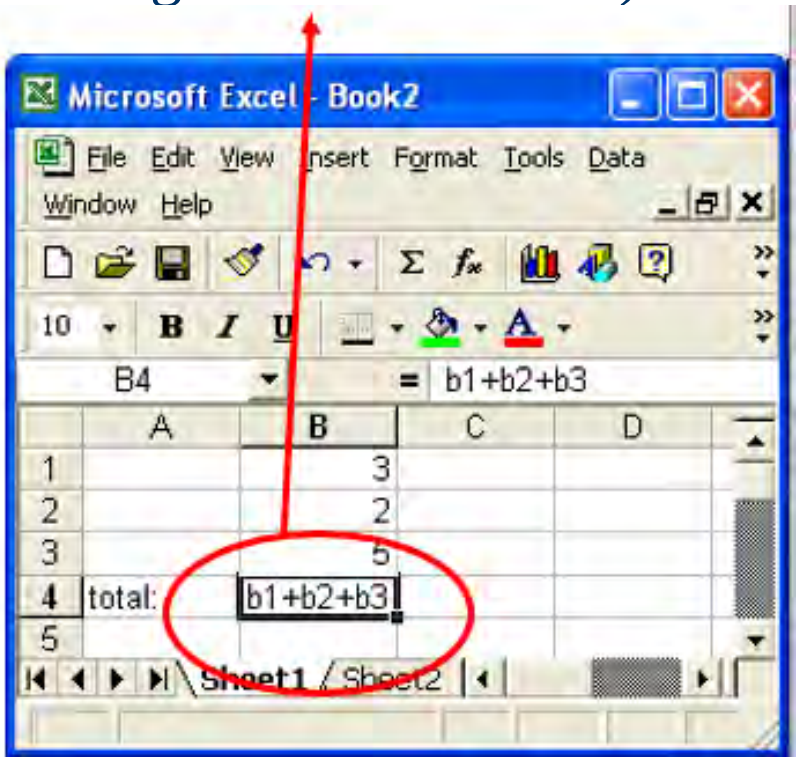


2.1. EXCEL FORMULAS
2.1.2. MISSING = SIGN

Missing = sign!
Before pressing enter



After pressing ENTER
(no change - not a function)



2.1. EXCEL FORMULAS
2.1.3. TYPES OF OPERATIONS

- You can use any of the following operations in a formula:

operation	symbol	example
addition:	+	=a1+3
subtraction:	-	=100-b3
multiplication:	*	=a1*b1
division:	/	=d1/100
exponentiation	^	=a2^2
negation (same symbol as subtraction)	-	=-a2+3

2.1. EXCEL FORMULAS

2.1.4. EXPLICIT (LITERAL) VALUES AND CELL REFERENCES

- You can use both explicit values and cell references in a formula
- An explicit value is also called a **literal value**
  - Formula with only cell references: = a1*b1
  - Formula with only literal values: =100/27
  - Formula with both cell references and literal values:

    = a1/100

2.1. EXCEL FORMULAS
2.1.5. COMMON ERRORS IN FORMULAS

- The following are some errors that may appear in a spreadsheet (there are others too).
  - **#######**
    - Cell is too narrow to display the results of the formula. To fix this simply make the column wider and the “real” value will be displayed instead of the ###### signs. Note that even when the ###### signs are being displayed, Excel still uses the “real” value to calculate formulas that reference this cell.
  - **#NAME?**
    - You used a cell reference in the formula that is not formed correctly (e.g. =BB+10 instead of =B3+10)
  - **#VALUE!**
    - Usually the result of trying to do math with a textual value. Example: =A1*3 where A1 contains the word “hello”
  - **#DIV/0!**
    - Trying to divide by zero. Example: =3/A1 where A1 contains 0 (zero)
  - **Circular Reference**
    - Using a formula that contains a reference to the cell that the formula “lives in”. Example: putting the formula =A1+1 in cell A1 or putting the formula =SUM(A1:B2) in any of the cells A1, B1, A2, B2

2.1. EXCEL FORMULAS
2.1.6. ORDER OF OPERATIONS

- When using several operations in one formula, Excel follows the order of operations for math.
  - first: all parentheses - innermost first
  - second: exponents (^)
  - third: all multiplication (*) and division (/). Do these starting with the leftmost * or / and work to the right.
  - fourth: all addition (+) and subtraction (-). Do these starting with the leftmost + or - and work to the right.

2.1. EXCEL FORMULAS

2.1.7. DISPLAY FORMULAS IN EXCEL BY “ctrl with ~ key”

- To see the formulas in the worksheet
  - Press the Cntrl key at the same time as you press the ` key (i.e. Cntrl with ~)
  - Press Cntrl with ~ again to see the values

I	J	K
	1	23
	2	26
	3	58
	4	96
	=SUM(J4:J7)	=SUM(K4:K7)

2.2. FUNCTION
2.2.1. WHAT IS FUNCTION?

- A function is a "named operation"
- Functions have
  - a name
  - parentheses
  - parameters/arguments inside the parentheses
    - The words parameter and argument mean the same thing
    - you can have many parameters for one function separated with commas (,)
    - The number of parameters is one more than the number of commas.

2.2. FUNCTION
2.2.2. THE “SUM” FUNCTION

- Examples

Function	Result
=SUM(1,2,3,4,5)	15
=SUM(a1,b1,c1)	a1+b1+c1
=SUM(9,a1,b2,5,c1)	9+a1+b2+5+c1

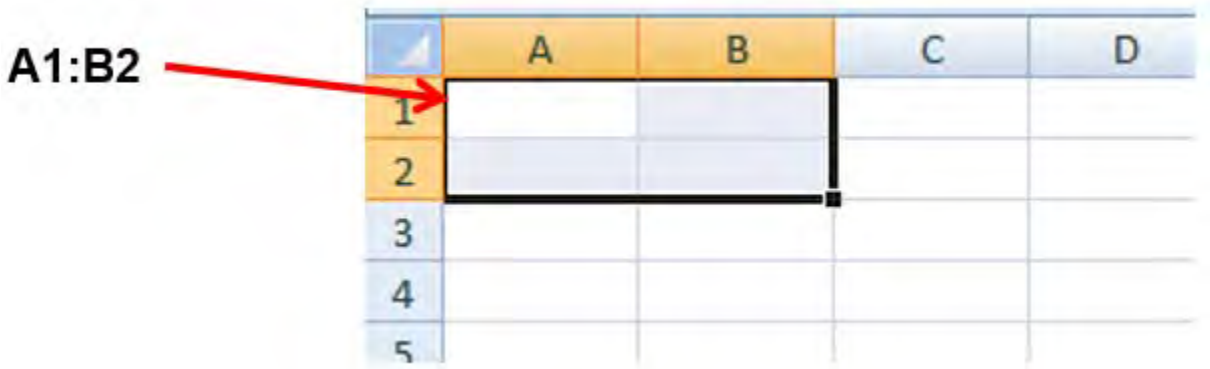
2.2. FUNCTION
2.2.3. TERMINOLOGY

SUM(1,2,3,4,5)

- The **name** of the function is "SUM"
- The **parameters** or **arguments** to this function are 1,2,3,4 and 5
- The entire thing, i.e. SUM(1,2,3,4,5), is a **function call**
- The **value** of this function call is 15.
  Another way to say this is that this function call **returns** 15.

2.2. FUNCTION
2.2.4. RANGES

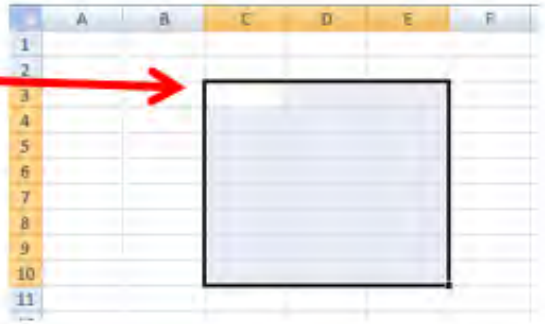
- A rectangular box of cells is called a “range”.
- The name of a range is
  - the name of the upper left cell of the range
  - Followed by a colon :
  - Followed by the lower right cell of the range
- Example: A1:B2 is shorthand for A1,A2,B1,B2
  - See next slide for more examples



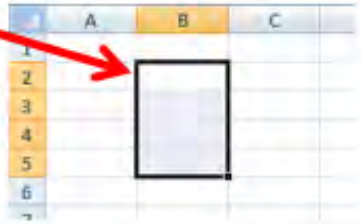
EXAMPLES 2.1:
RANGE NAMES

Examples

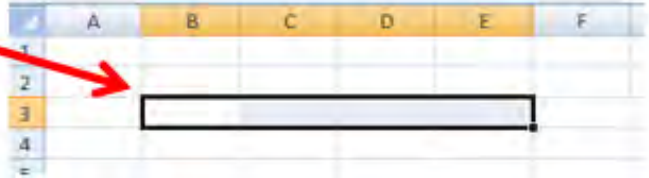
C3:E10



B2:B5



B3:E3



2.2. FUNCTION
2.2.5. USING A RANGE AS A PARAMETER

- Ranges can be specified as a parameters to a function call.
- Both of the following function calls produce the same result as =a1+b1+c1+a2+b2+c2+a3+b3+c3+a4+b4+c4
  however the 2nd version uses a range and is much shorter.

  without a range
  =SUM(a1,b1,c1,a2,b2,c2,a3,b3,c3,a4,b4,c4)

  with a range
  =SUM(a1:c4)

2.2. FUNCTION

2.2.6. FUNCTION CALLS WITH MULTIPLE PARAMETERS

- You can include multiple ranges and cells as parameters
- Example: the following function call has 3 parameters. There are two ranges (a1:b2 and c4:c7), one number (100) and one cell reference (d3)

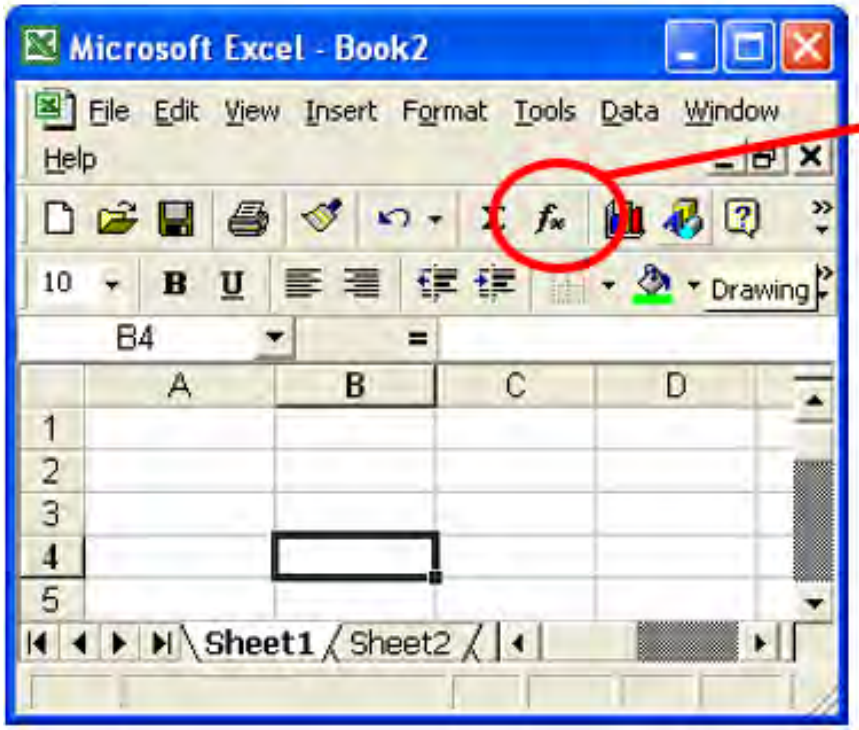
  =SUM(a1:b2,100,c4:c7,d3)

  Is the same as:

  =SUM(a1,a2,b1,b2,100,c4,c5,c6,c7,d3)

2.3. OTHER FUNCTIONS

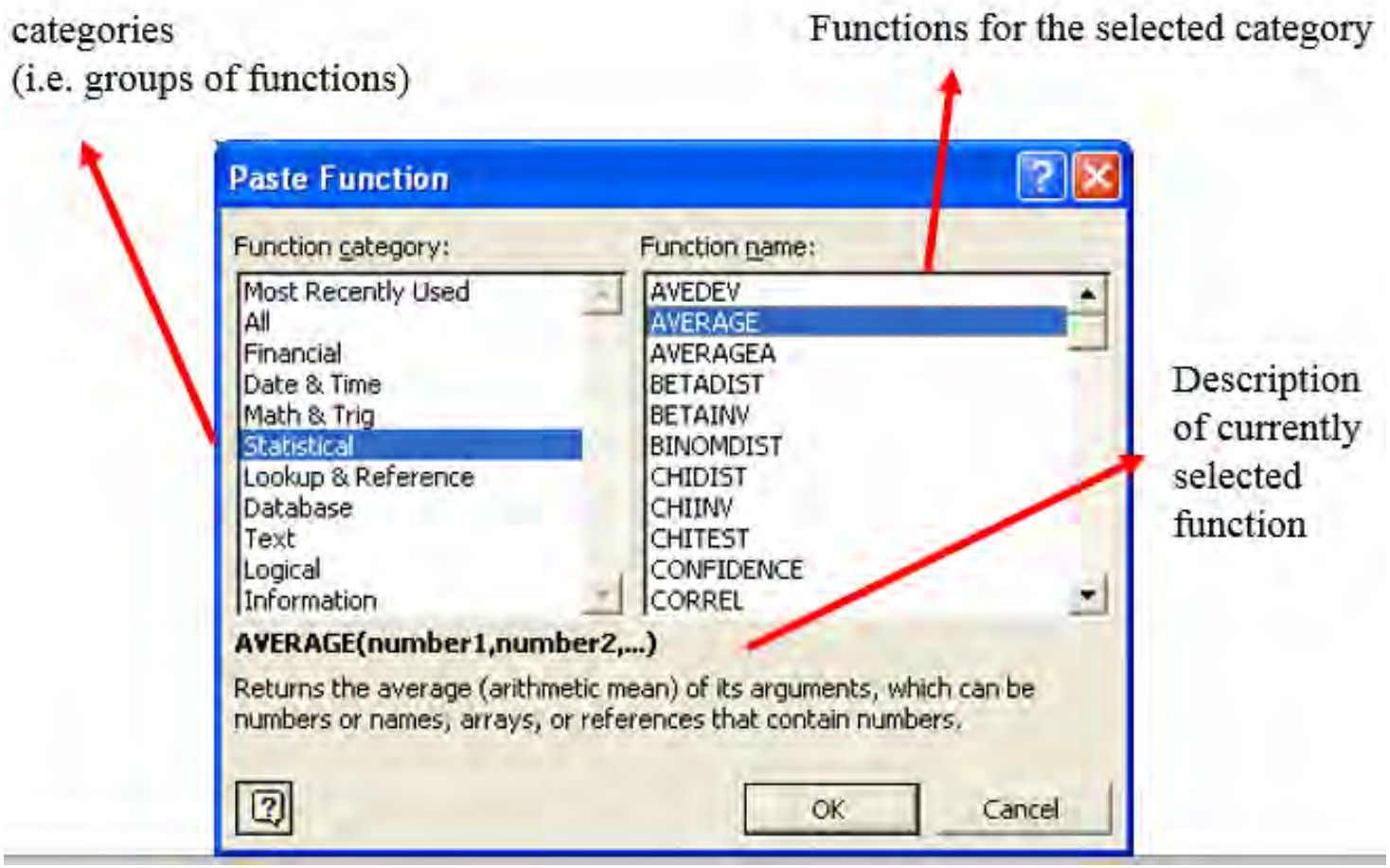
- Click the function button to see the available functions:



Function button

brings up the function dialog box (see next slide)

2.3. OTHER FUNCTIONS
2.3.1. FUNCTION DIALOG BOX



2.4. FUNCTION EDITOR

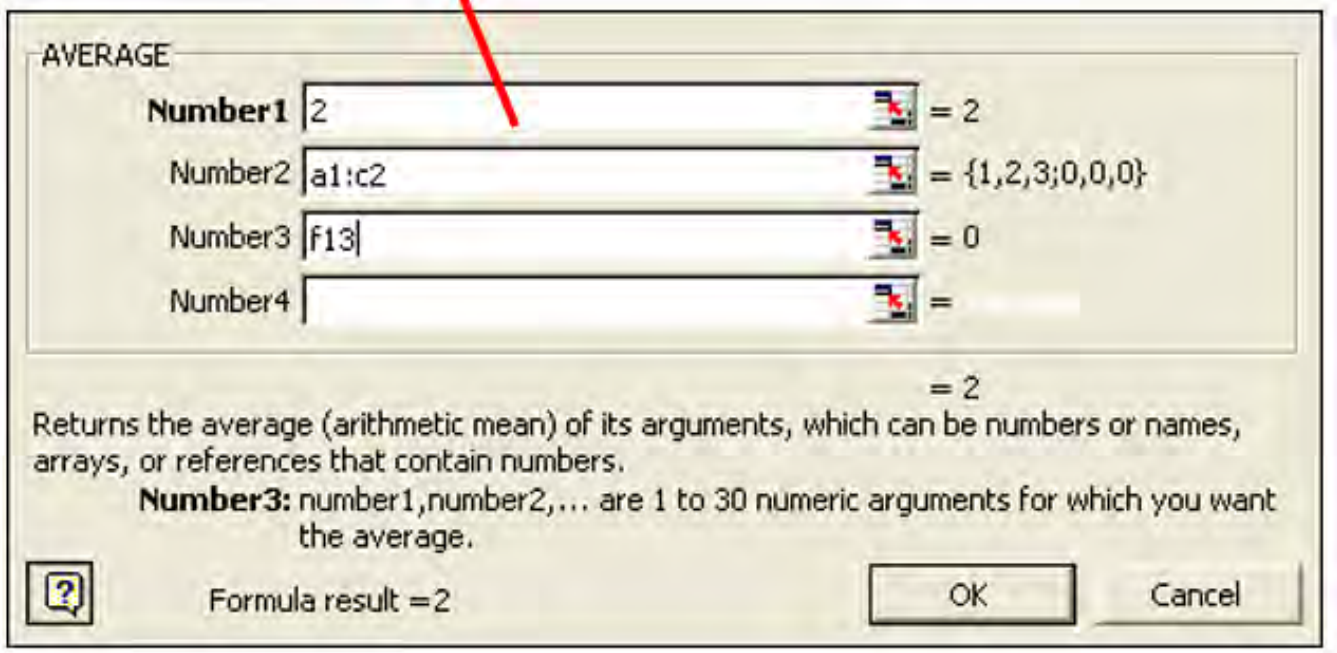
- Double click on the function name to get a dialog box that helps you enter values for the parameters of the function.
  (see next slide)

2.4. FUNCTION EDITOR Cont'd

Put values for the parameters in the edit boxes.

When you press OK, this will create the function call:

AVERAGE(2,a1:c2,f13)



EXAMPLE 2.2:

- AVERAGE

formula that contains a function	value
=AVERAGE(2,4,10,4)	5
=AVERAGE(a1,f32)	(a1+f32) / 2
=AVERAGE(a1:c1)	(a1+b1+c1) / 3
=AVERAGE(a1:c1,10)	(a1+b1+c1+10) / 4

2.4. FUNCTION EDITOR Cont'd

2.4.1. COMBINATION FUNCTION AND OTHER VALUES IN A SINGLE FORMULA

- You can combine functions, cell references and literal values to make a complex Excel formula
- Examples

  =3 + b23 * SUM(d20:g20)

  =SUM(a1,100) * AVERAGE(d10:j10)

  =100 / (AVERAGE(b2,c2,d30) + AVERAGE(f1:f20))

2.5. CELLS REFERCENCES
2.5.1. ENTIRE ROWS (e.g. 2:2 or 2:4)

- A cell reference of the form <rowName>**:**<rowName> refers to the range of all the cells for those rows.
- Example:
  - The reference, 2**:**2, refers to all of the cells on the 2nd row.
  - The following formula adds up all of the values on the 2nd and 4th rows of the spreadsheet:

    =sum(2:2,4:4)
- Another Example:
  - The reference, 2**:4**, refers to all of the cells on the 2nd , 3rd and 4th rows,.
  - The following formula adds up all of the values on the 2nd, 3rd, 4th , 10th, 11th , 12th, 13th, 14th and 15th rows of the spreadsheet:

    =sum(2:4,10:15)

2.5. CELLS REFERCENCES
2.5.2. ENTIRE COLUMNS (e.g. B:B or B:D)

- A cell reference of the form <colName>**:**<colName> refers to the range of all the cells for those columns.

- Example:
  - The reference, B**:**B, refers to all of the cells in the 2nd column.
  - The following formula adds up all of the values in the 2nd and 4th columns of the spreadsheet:

    =sum(B**:**B,D:D)

- Another Example:
  - The reference, B**:D**, refers to all of the cells in the 2nd, 3rd and 4th columns.
  - The following formula adds up all of the values in the 2nd, 3rd, 4th, 6th and 7th columns of the spreadsheet:

    =sum(B:D,F:G)

2.5. CELLS REFERCENCES

2.5.3. REFERENCES TO CELLS ON OTHER WORKSHEETS

- Cell on another sheet: ***sheetName!cellReference***
- Range on another sheet: ***sheetName!range***
- Row on another sheet: ***sheetName!row:row***
- Column on another sheet: ***sheetName!column:column***

- **If a sheet name has a space in it, you must surround the sheet name with apostrophes (i.e. single quotes)**

- Examples

  sheet2!a1
  sheet2!b4:c8
  '2002 Forecasts'!f3:f10
  =sum('2002 Forecasts'!f3:f10)
  =sum('2202 Forecasts'!f:f)

EXAMPLE 2.3

CELLS REFERENCES IN ACTIVE AND IN ANOTHER SHEET

- Add up values from 2 different sheets

  =sum ('great stocks'!b2:c4, 'so so stocks'!b2:c4)

- This next one is a little confusing

  =sum (a1,a!a1,b1:b4,b1!b4,c!c:c)

Explanation

a1	this is a cell reference on the current sheet
a!a1	"a" is the name of sheet. "a1" is a cell on the "a" sheet
b1:b4	this is a range on the current sheet
b1!b4	"b1" is the name of a sheet. "b4" is a cell on the "b1" sheet
c!c:c	“c" is the name of a sheet. “c:c" is all of the cells in the c column on the “c” sheet

2.5. CELLS REFERCENCES

2.5.4. ABSOLUT AND RELATIVE CELL REFERENCES

- By default, when you copy a formula that contains a cell reference, excel will automatically adjust the cell reference.
- You can stop Excel from automatically adjusting the cell reference by using one or more dollar signs ($) in the cell reference. These are called absolute cell references.
- A cell reference without a dollar sign is a relative cell reference.

EXAMPLE 2.4

- The following all refer to the same cell

  d9

  d9

  $d9

  d$9

- The only difference between these cell references relates to what happens when you copy a formula that contains the cell reference.

2.5. CELLS REFERCENCES
2.5.5. RELATIVE CELL REFERENCE

- **d9** This is a "relative cell reference".
  - Changing the column: If I copy this cell reference to another cell:
    - the "d" will increment one letter for every cell that I move over to the right.
    - The "d" will decrement one letter for every cell that I move over to the left
  - Changing the row: If I copy this cell reference to another cell:
    - the "9" will increment by one for every cell that I move down.
    - The "9" will decrement by one for every cell that I move up

2.5. CELLS REFERCENCES
2.5.6. ABSOLUTE CELL REFERENCE

- **d9** This is an absolute cell reference.
  - If I copy a formula with this cell reference, the cell reference will NOT change AT ALL.

2.5. CELLS REFERCENCES
2.5.6. MIXED REFERENCES

- **$d9** and **d$9** These are "Mixed" cell references:
- $d9
  - The "d" will stay the same when you copy the cell, but the "9" will change.
- d$9
  - The "d" will change when you copy the cell, but the "9" will stay the same.

2.6. TEXT / STRING / CHARACTER

- The following three terms all used to refer to "text" data. All three terms mean the same thing.
  - text data
  - string data
  - character data
- This presentation will generally use the term "text data" but you should be familiar with the terms "string data" and "character data"

2.6. TEXT / STRING / CHARACTER
2.6.1. TEXT DATA

- Text data is used to store general purpose text (e.g. names, places, descriptions, etc.)
- You can't do "math" with text values (obviously)

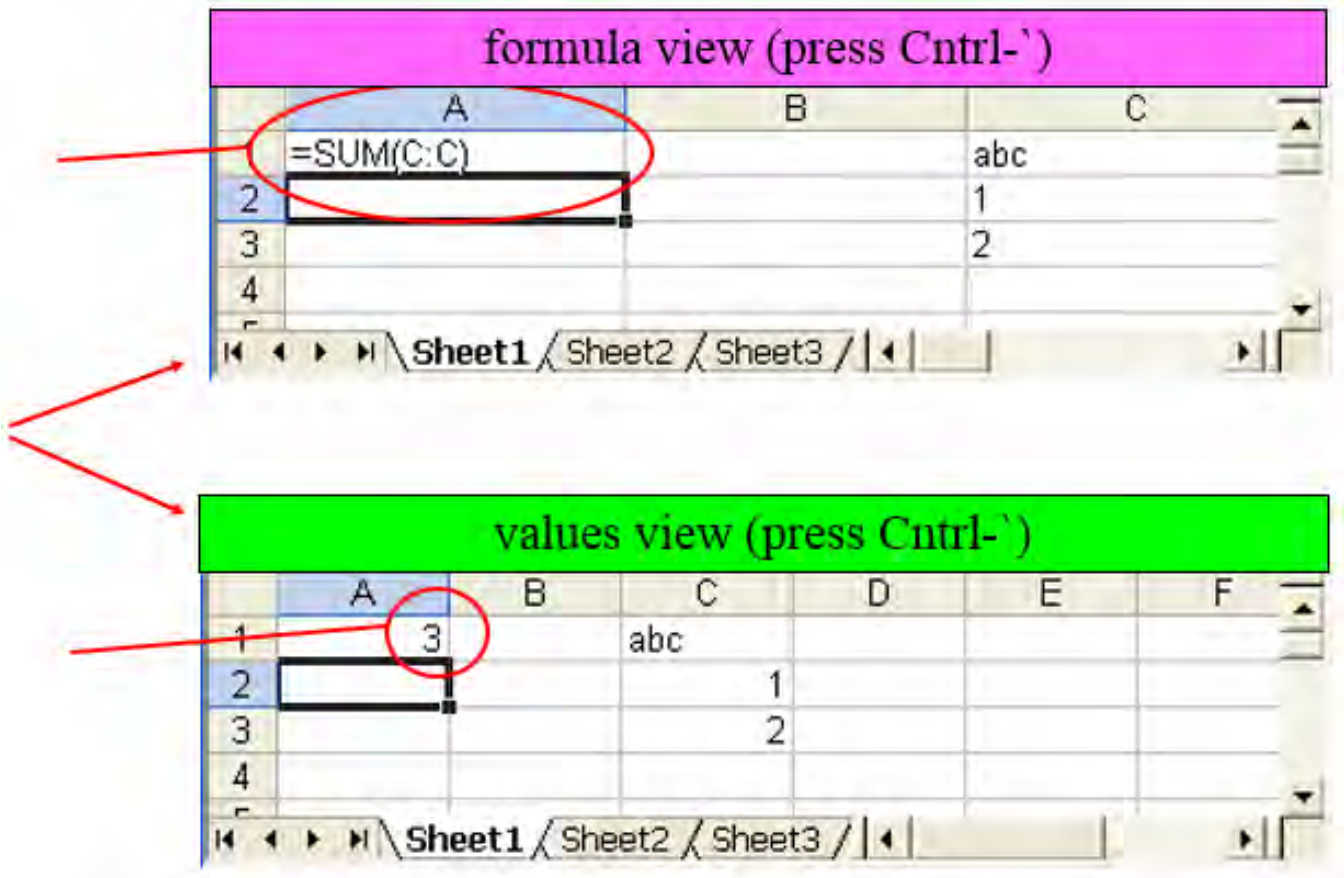
EXAMPLE 2.5:

TEXT IS NOT PART OF NUMERICAL CALCULATIONS (obviously)

Formula to add up all numbers in column C

(Same Spreadsheet)

Text data in C1 is not included in the Sum



2.6. TEXT / STRING / CHARACTER
2.6.2. TEXT FUNCTIONS

- Many functions are used to manipulate text values.
- The following are only some of them

  right( )
  left( )
  mid( )
  concatenate( )
  lower( )
  upper( )
  len( )

2.6. TEXT / STRING / CHARACTER
2.6.3. RIGHT FUNCTION

- The RIGHT function is used to isolate a specific number of “characters” from the right hand side of a text value.
- (example on next slide)

EXAMPLE 2.6:
OF RIGHT FUNCTION

Formula View

	A	B
1	**SSN**	**Last 4 digits**
2	012345678	=RIGHT(A2,4)
3	0001112222	=RIGHT(A3,4)

Values View

	A	B
1	**SSN**	**Last 4 digits**
2	012345678	5678
3	0001112222	2222

2.6. TEXT / STRING / CHARACTER
2.6.3. RIGHT FUNCTION Cont'd

- The <numCharacters> parameter in the RIGHT function is optional. If you don't specify it the default is 1 (one).

Formula View

	A	B	C	D	E
1	Word	Calls to the "RIGHT" function			
2	ABCDE	=RIGHT(A2,3)	=RIGHT(A2,2)	=RIGHT(A2,1)	=RIGHT(A2)

These produce the same results.

Values View

	A	B	C	D	E
1	Word	Calls to the "RIGHT" function			
2	ABCDE	CDE	DE	E	E

2.6. TEXT / STRING / CHARACTER
2.6.4. LEFT FUNCTION

- The LEFT function is the same as the RIGHT function, but it returns characters from the LEFT side of the value.

2.6. TEXT / STRING / CHARACTER
2.6.5. MID FUNCTION

- MID is used to get values from the middle of some text.
- MID takes 3 parameters:
  - The original text
  - The position to start taking the new value from
  - The number of characters to take for the new value
- Example on next slide

EXAMPLE 2.7:
OF MID FUNCTION

Formula View

	A	B
1	ABCDEFGHIJKL	=MID(A1,2,3)

Values View

	A	B
1	ABCDEFGHIJKL	BCD

2.7. CONCATENATION

- Use & to combine (or concatenate) two different text values

Formula View

	A	B	C
1	FIRST NAME	LAST NAME	FULL NAME
2	John	Doe	=A2&B2
3	Paul	Smith	=A3&B3
4	David	Washington	=A4&B4

Values View

	A	B	C
1	FIRST NAME	LAST NAME	FULL NAME
2	John	Doe	JohnDoe
3	Paul	Smith	PaulSmith
4	David	Washington	DavidWashington

Notice that there is no space between the two values

2.7. CONCATENATION
2.7.1. CONCATENATE MANY VALUES

- You may concatenate many values together

Formula View

	A	B	C	D
1	**FIRST**	**MIDDLE**	**LAST**	**FULL**
2	John	Quincy	Doe	=A2&B2&C2
3	Paul	Walker	Smith	=A3&B3&C3
4	David	Steven	Washington	=A4&B4&C4

Values View

	A	B	C	D
1	**FIRST**	**MIDDLE**	**LAST**	**FULL**
2	John	Quincy	Doe	JohnQuincyDoe
3	Paul	Walker	Smith	PaulWalkerSmith
4	David	Steven	Washington	DavidStevenWashington

2.7. CONCATENATION
2.7.2. CONCATENATION WITH “literal” VALUES

- You can also concatenate "literal" values.
- You must include the literal values inside quotes
- For example to display spaces in the "full name" in the previous example you could use the following formula. Each space that you want to display must be included in quotes.

  =A2&" "&B2&" "&C2
  (Don't forget any of the &'s)
- See next slide ...

EXAMPLE 2.8:
CONCATENATION SPACES

- You can concatenate spaces into a formula

Formula View

	A	B	C	D
1	**FIRST**	**MIDDLE**	**LAST**	**FULL**
2	John	Quincy	Doe	=C2&" "&B2&" "&A2
3	Paul	Walker	Smith	=C3&" "&B3&" "&A3
4	David	Steven	Washington	=C4&" "&B4&" "&A4

Values View

	A	B	C	D
1	**FIRST**	**MIDDLE**	**LAST**	**FULL**
2	John	Quincy	Doe	Doe Quincy John
3	Paul	Walker	Smith	Smith Walker Paul
4	David	Steven	Washington	Washington Steven David

values contain spaces

2.8. LOWER & UPPER FUNCTION

- LOWER converts text to lower case.
- UPPER converts text to upper case.
- Example:

Formula View

	A	B	C
1	Hello There	=LOWER(A1)	=UPPER(A1)

Values View

	A	B	C
1	Hello There	hello there	HELLO THERE

2.9. LEN FUNCTION

- LEN returns a numeric value equal to the number of character in a text value (i.e. the “length” of the text value).
- Spaces ARE included in the length.
- Example

Formula View

	A	B
1	Hello There	=LEN(A1)

Values View

	A	B
1	Hello There	11

2.10. TRUE AND FALSE

- A logical value can be one of only two values

TRUE

or

FALSE

2.10. TRUE AND FALSE
2.10.1. TRUE

- The following statements are TRUE:

  Fish live in water.
  Deer live on land.

- The following statements are also TRUE:

  3 is greater than 2
  2 is less than 3
  2 is less than or equal to 3
  2 is less than or equal to 2
  3 is greater than or equal to 2
  3 is greater than or equal to 3
  2 is equal to 2
  2 is not equal to 3

2.10. TRUE AND FALSE
2.10.2. FALSE

- The following statements are FALSE:

  Fish live on land.
  Deer live in water.

- The following statements are also FALSE:

  2 is greater than 3
  3 is less than 2
  3 is less than or equal to 2
  2 is greater than or equal to 3
  2 is equal to 3
  2 is not equal to 2

2.11. LOGICAL FUNCTION
2.11.1. LOGICAL OPERATORS

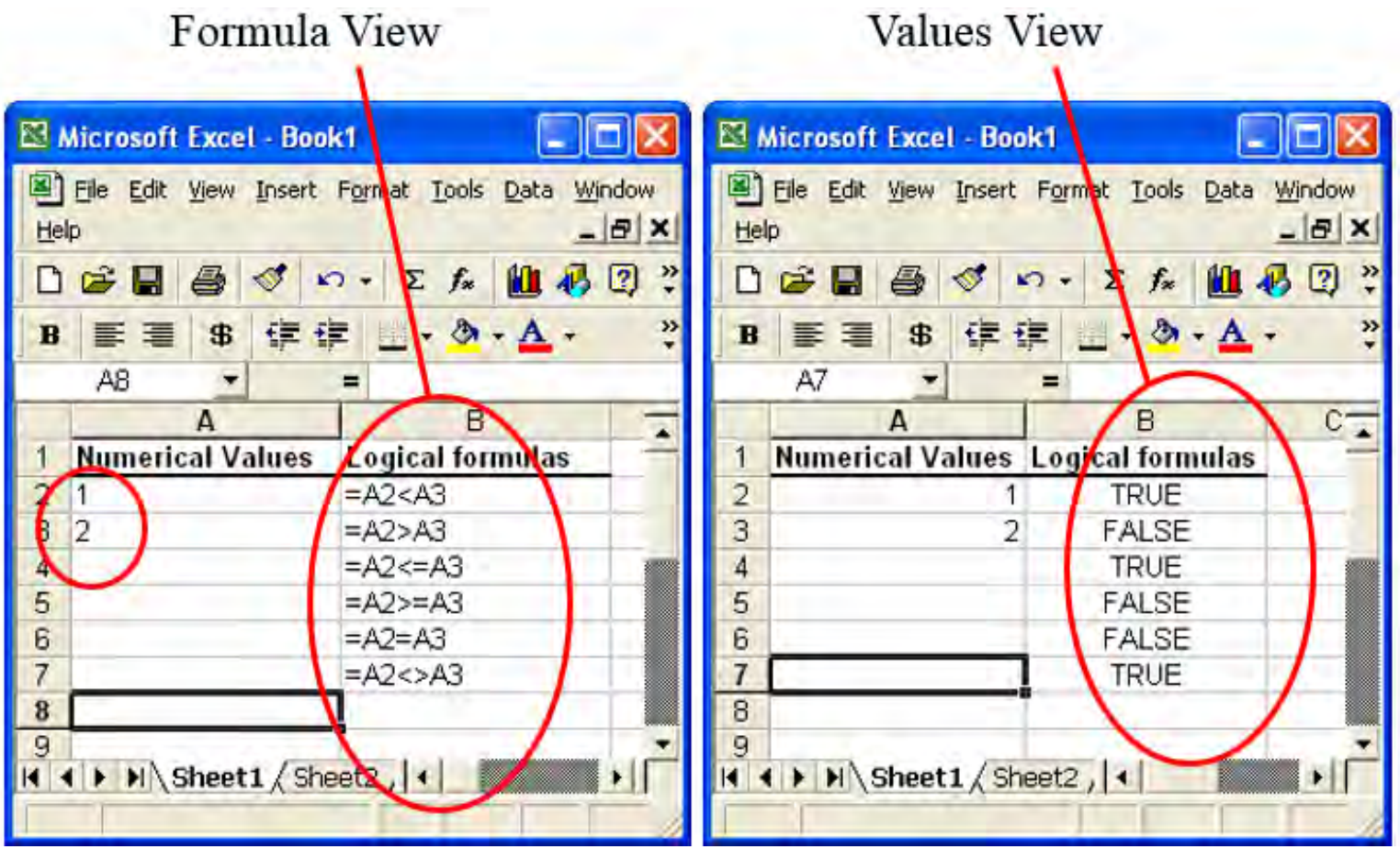
- In Excel the following "operators" are used

Operator	Meaning
>	greater than
<	less than
>=	greater than or equal to
<=	less than or equal to
=	equal to
<>	not equal to

- Examples

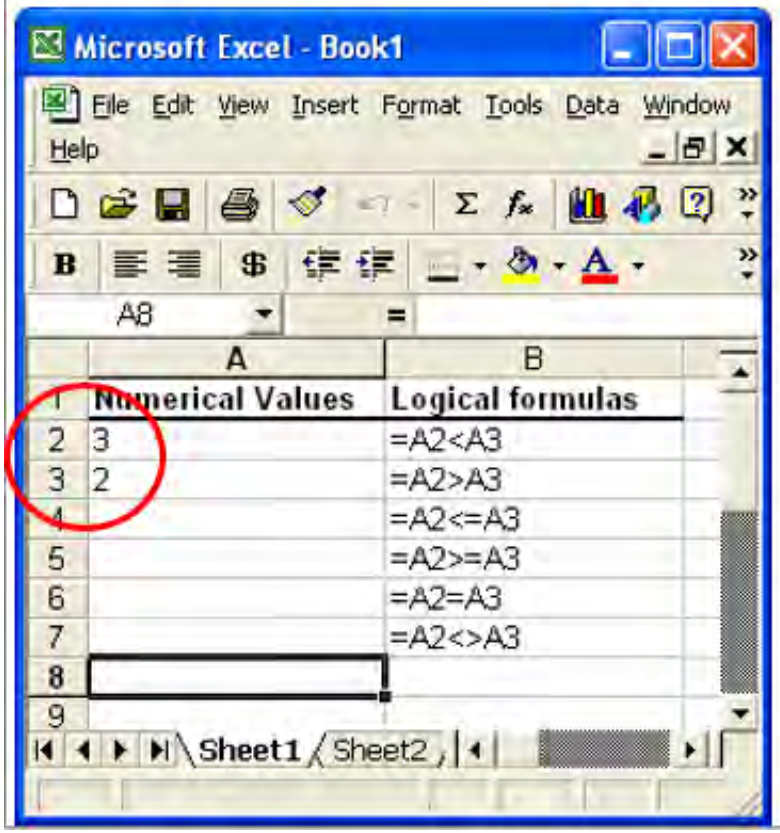
3 > 2	true
3 < 2	false

2.11. LOGICAL FUNCTION
2.11.2. LOGICAL FORMULAS

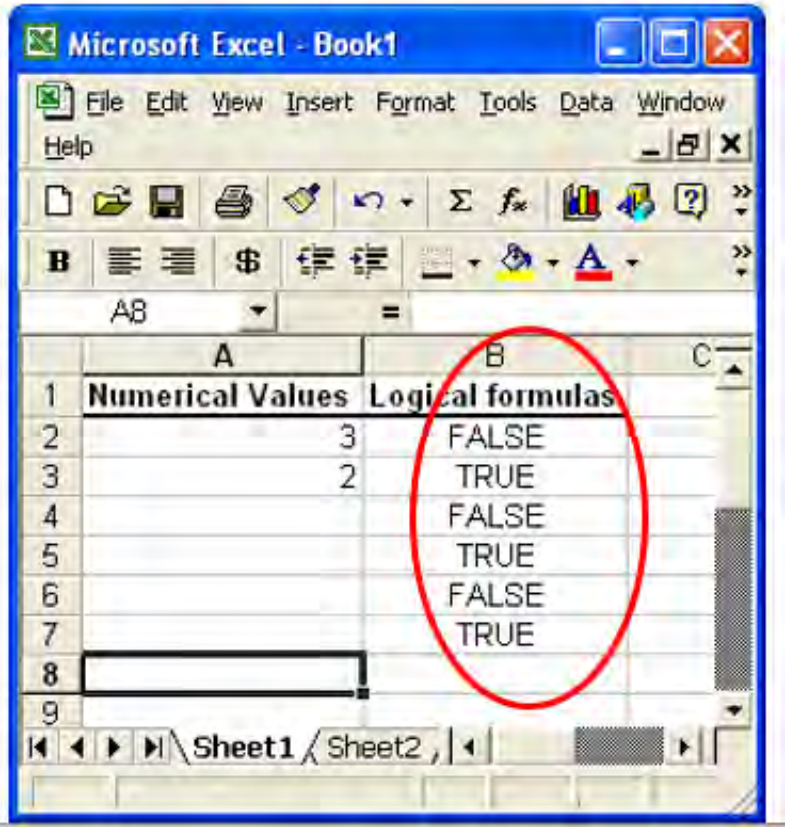


EXAMPLE 2.9:
OF FALSE AND TRUE

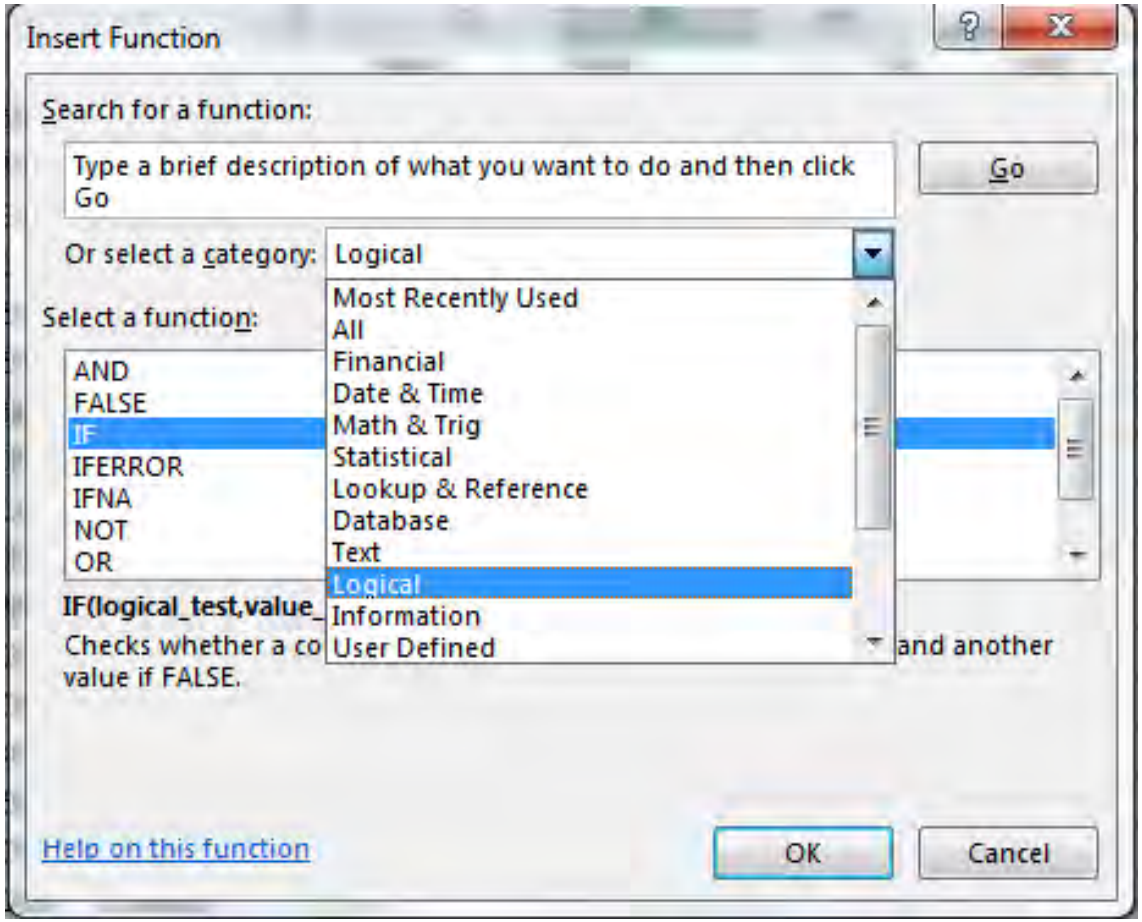
Formula View



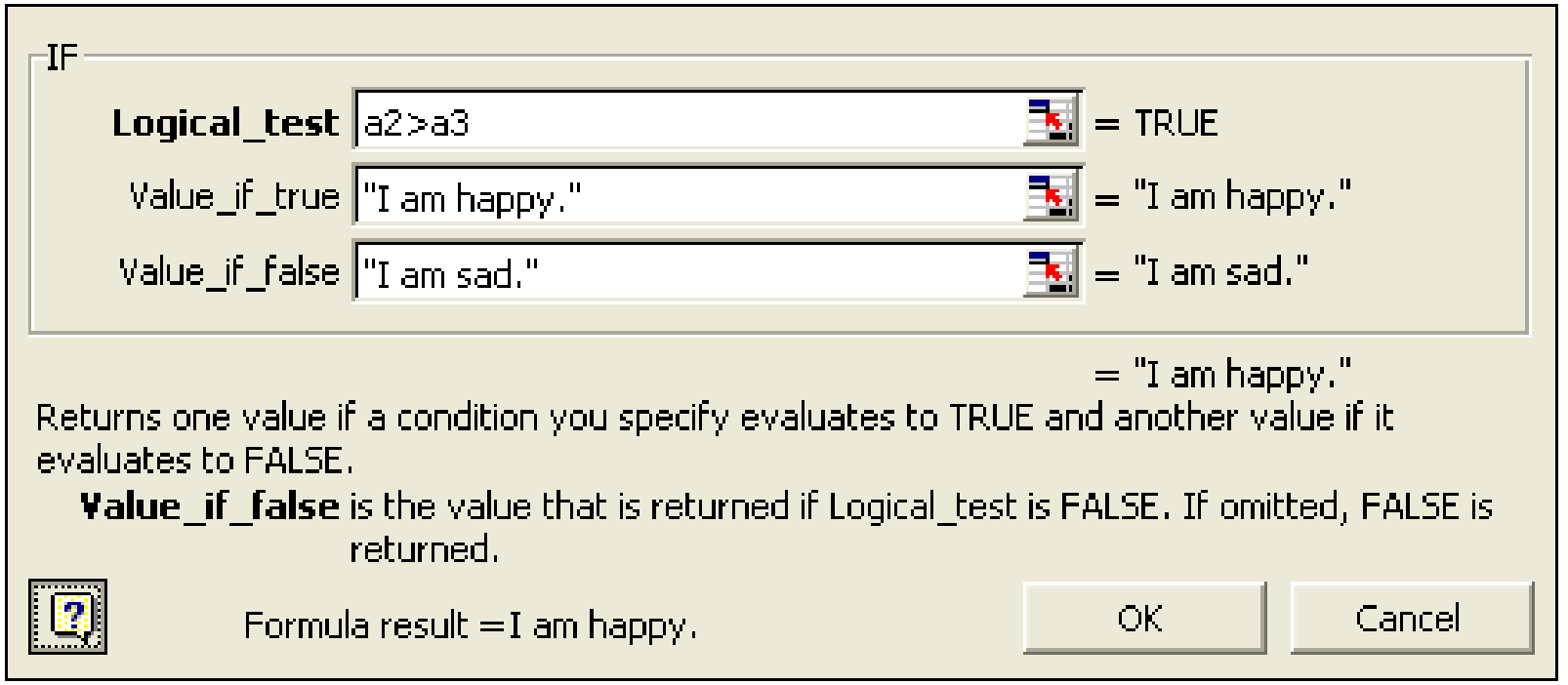
Values View



2.11. LOGICAL FUNCTION
2.11.3. IF FUNCTION

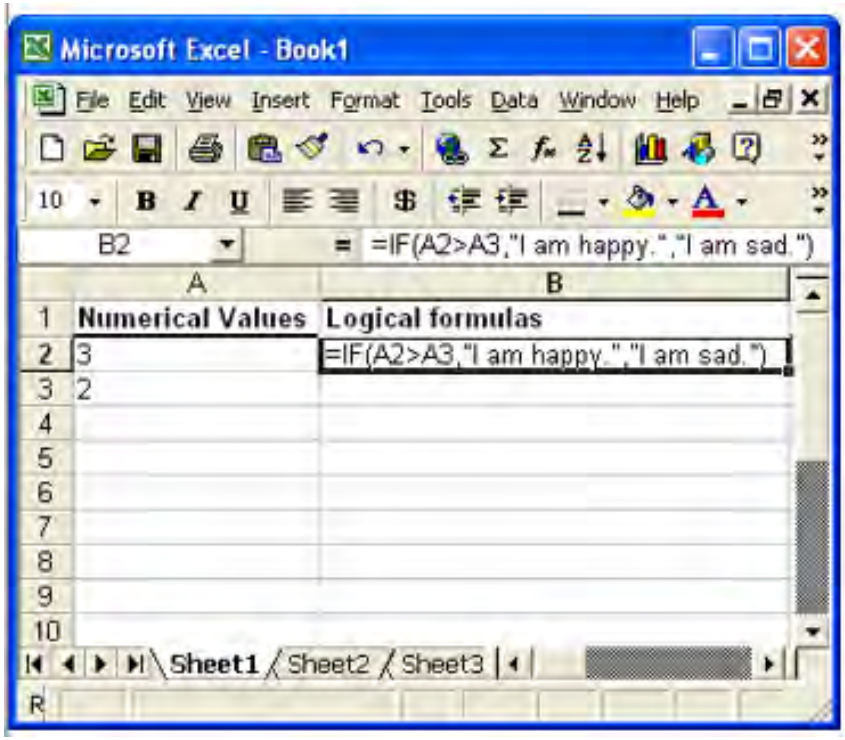


2.11. LOGICAL FUNCTION
2.11.3. IF FUNCTION Cont'd

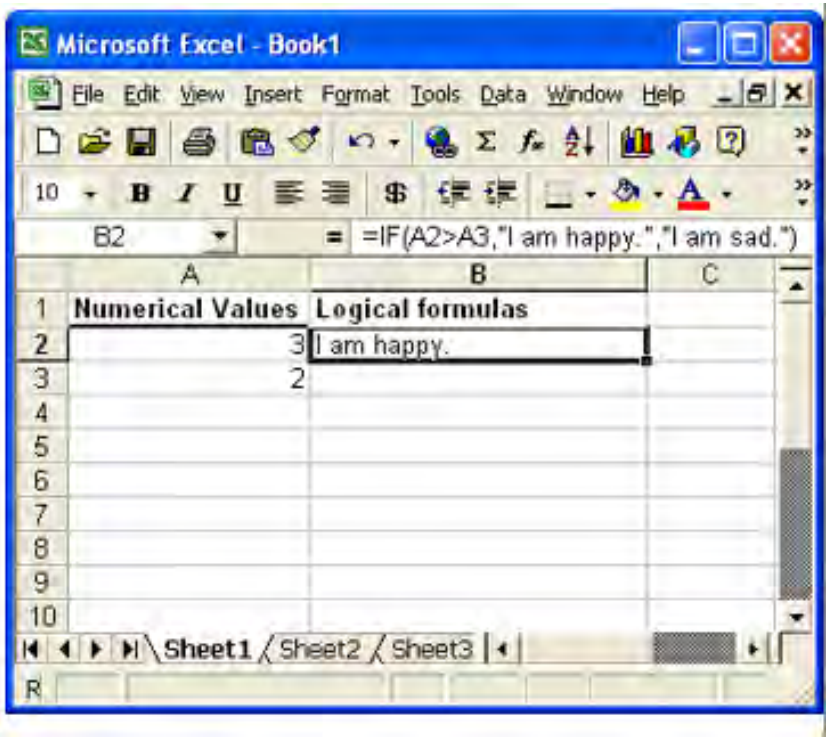


2.11. LOGICAL FUNCTION
2.11.3. IF FUNCTION Cont'd

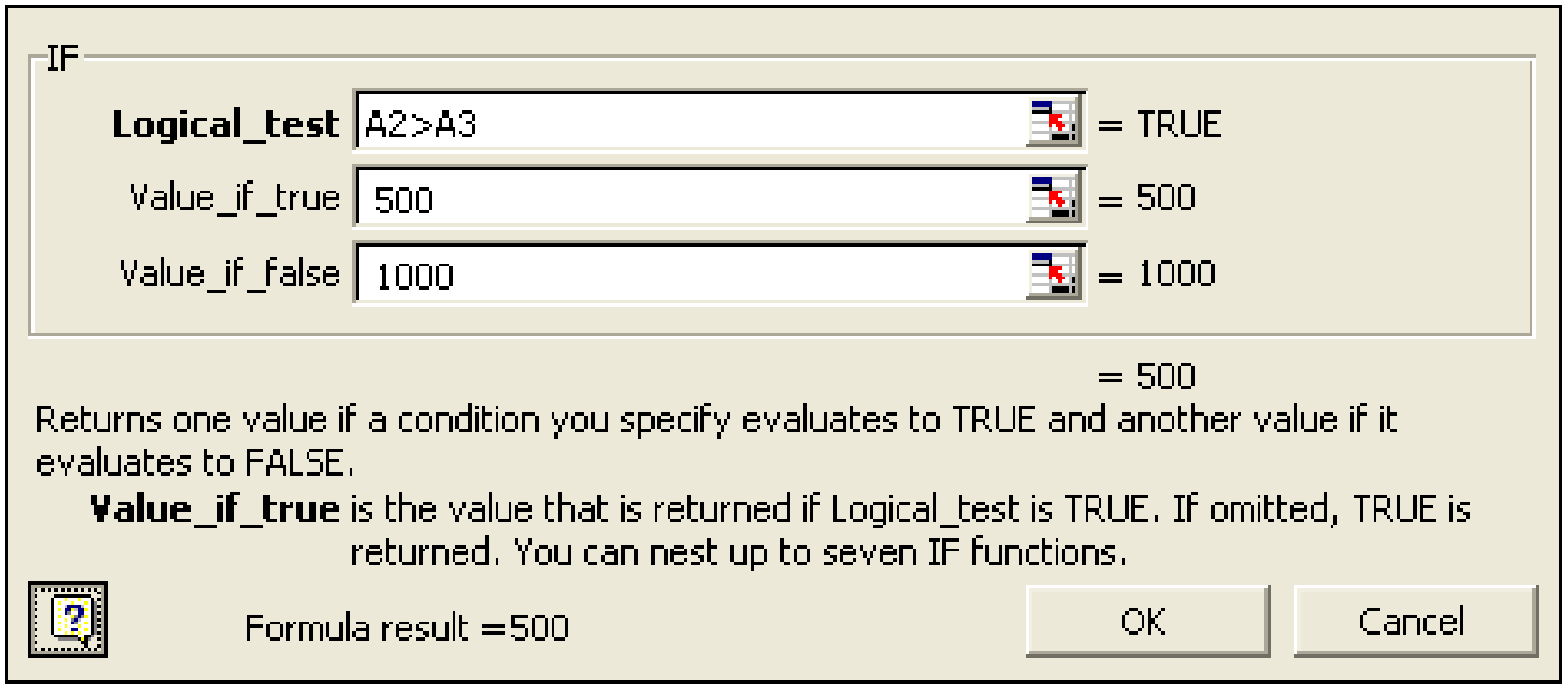
Formula View



Values View

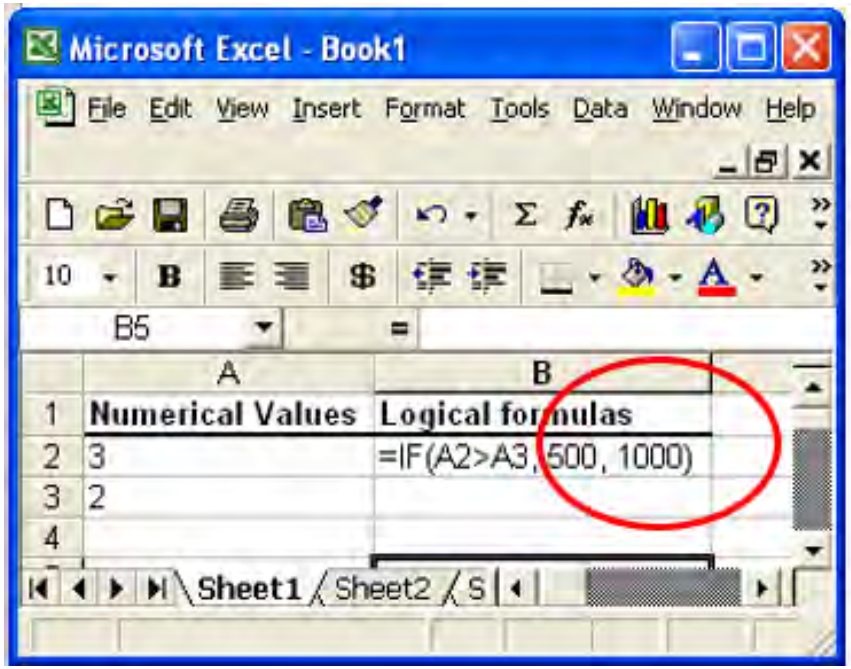


2.11. LOGICAL FUNCTION
2.11.4. IF WITH A NUMERIC RESULT

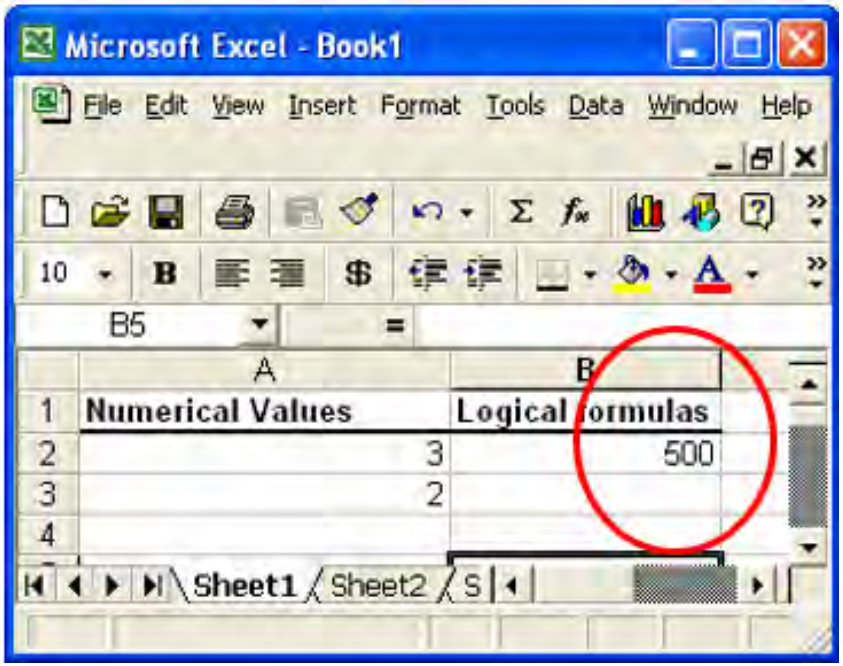


2.11. LOGICAL FUNCTION
2.11.4. IF WITH A NUMERIC RESULT Cont'd

Formula View



Values View



2.11. LOGICAL FUNCTION
2.11.5. AND / OR / NOT

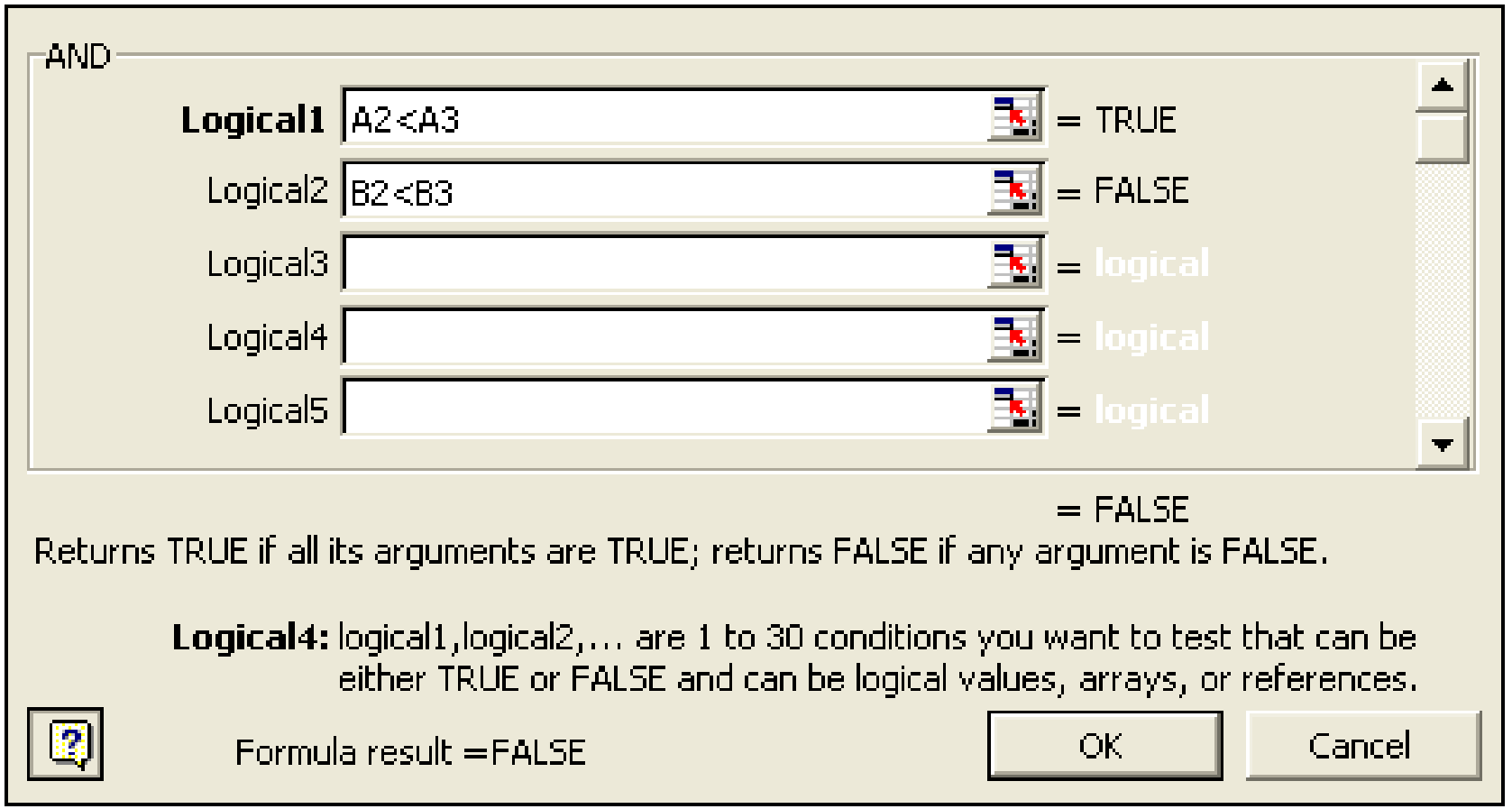
- The following is TRUE

  Fish live in water AND deer live on land.

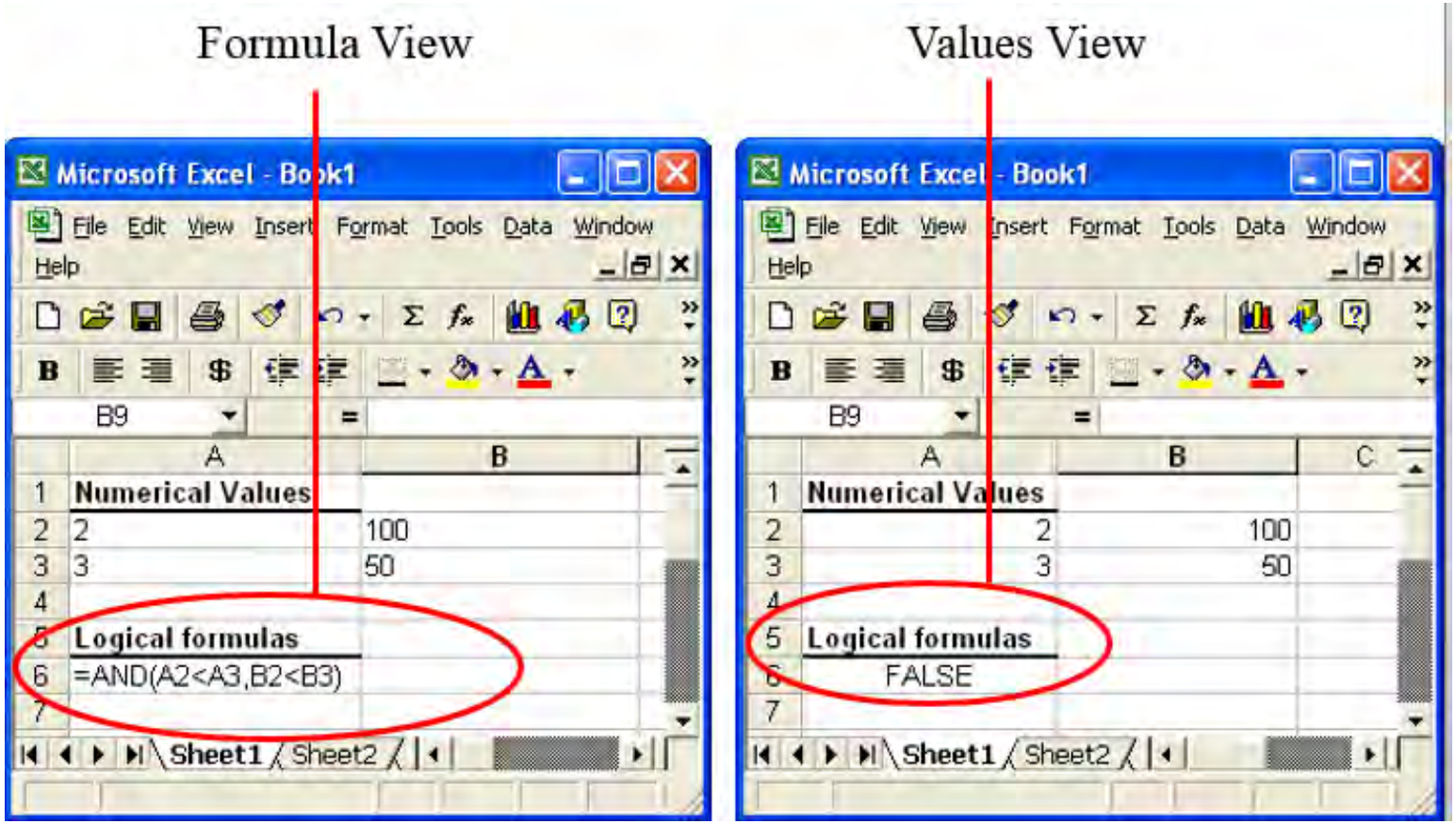
- The following are all FALSE

  Fish live in water AND deer live in water.
  Fish live on land AND deer live on land.
  Fish live on land AND deer live in water.

2.11. LOGICAL FUNCTION
2.11.5. AND / OR / NOT Cont'd



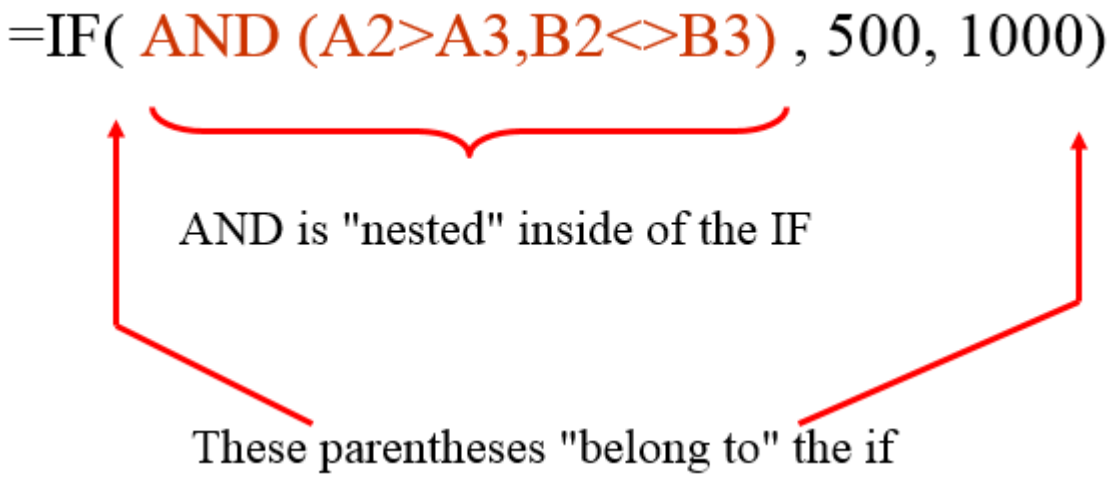
2.11. LOGICAL FUNCTION
2.11.5. AND / OR / NOT Cont'd



2.11. LOGICAL FUNCTION

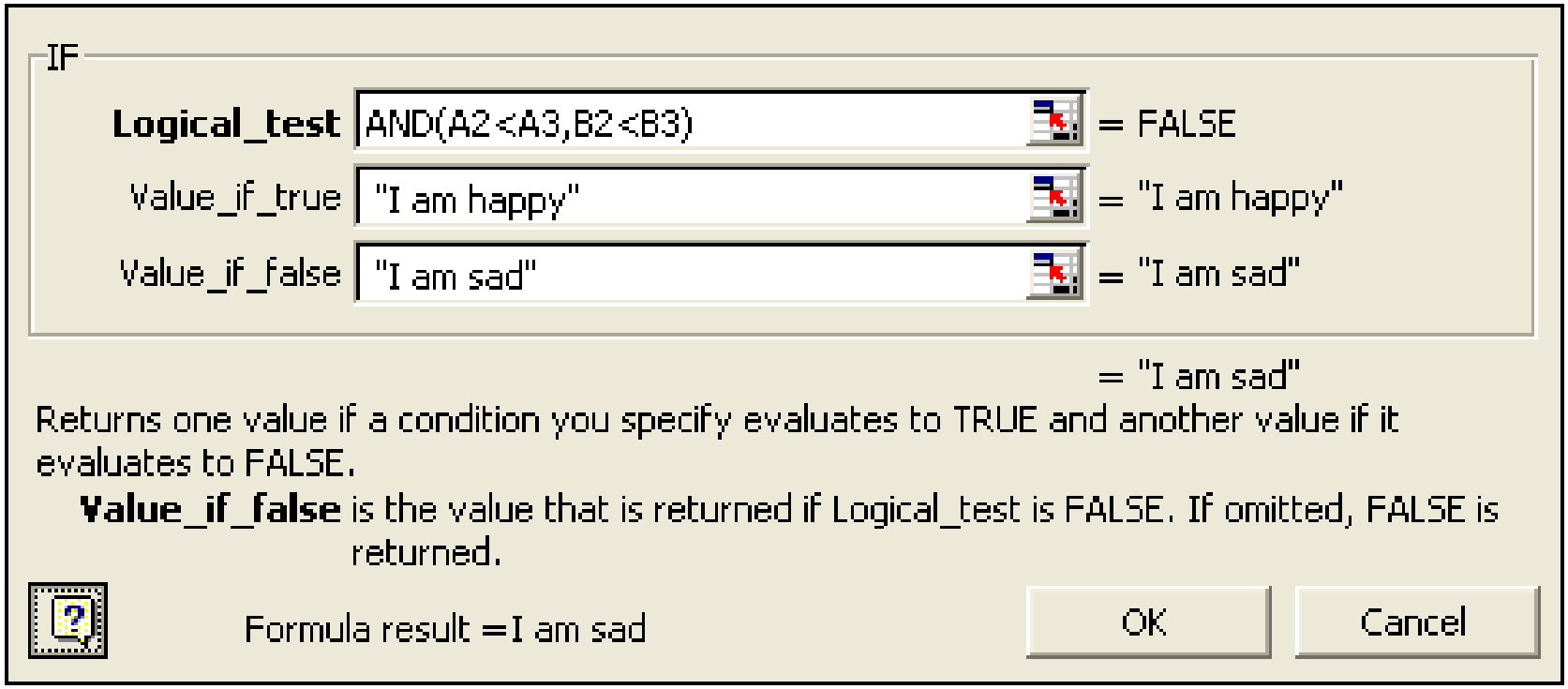
2.11.6. IF with AND –NESTED FUNCATION CALLS

- You can use an AND inside of an IF.
- This is called a NESTED FUNCTION CALL
- Example

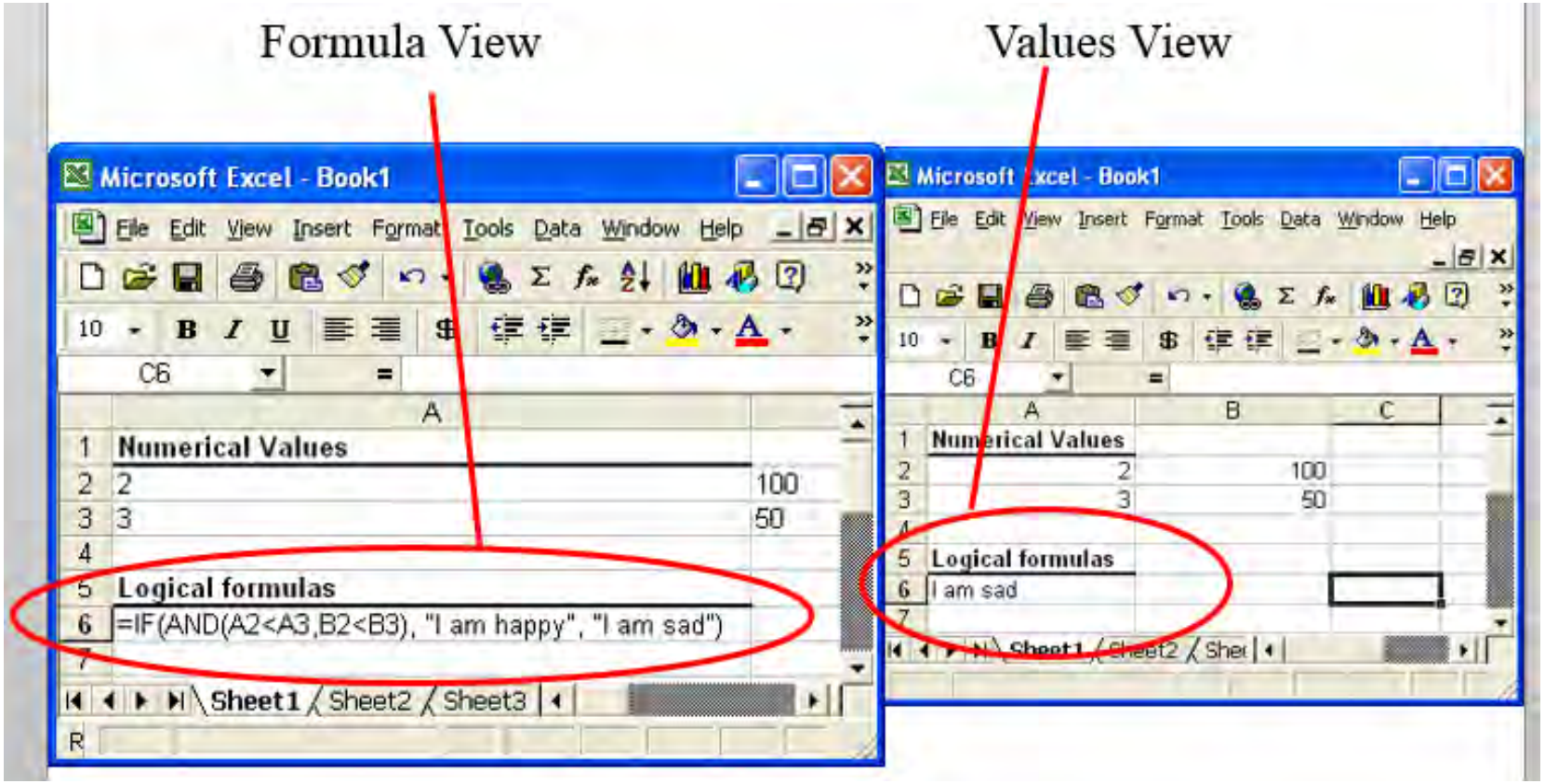


EXAMPLE 2.10:
OF “AND”

Parameters for IF function:



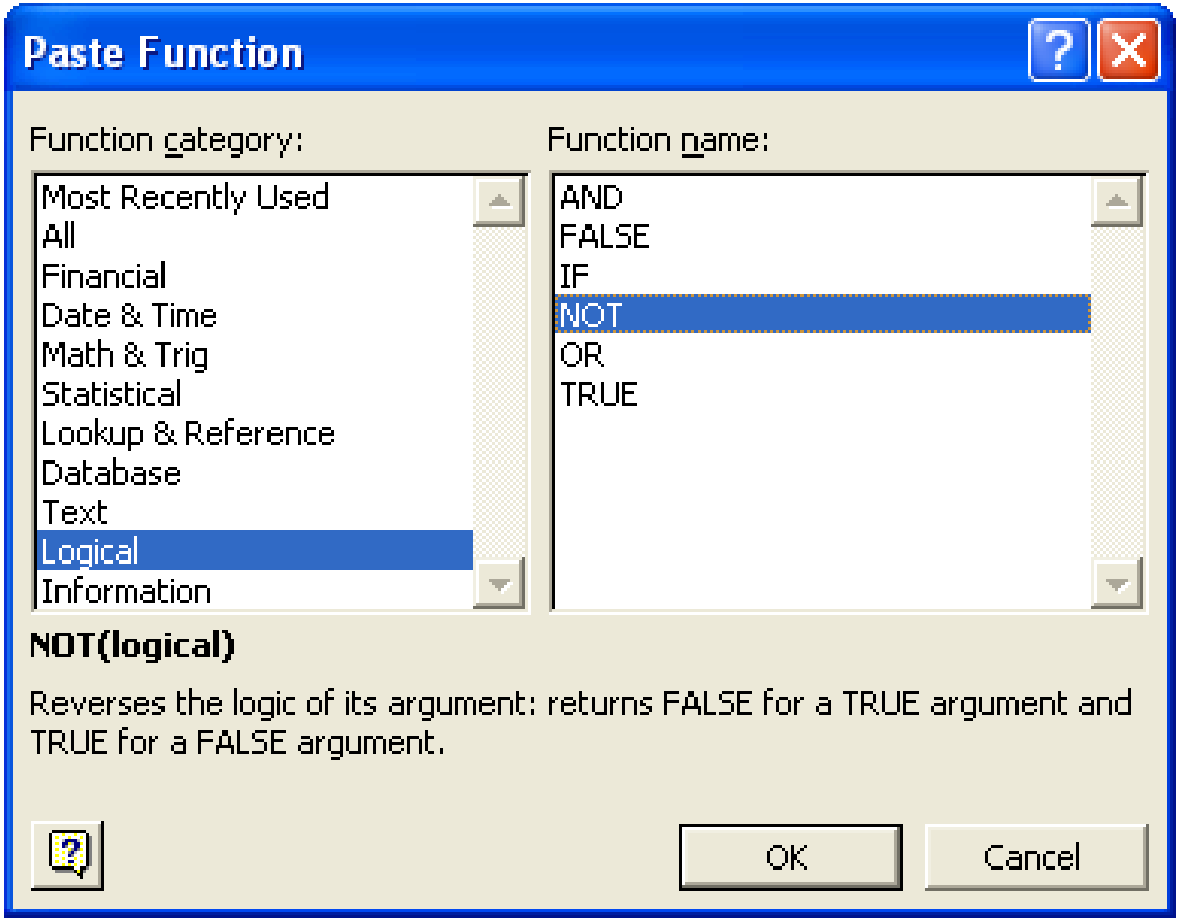
EXAMPLE 2.11:
OF IF with AND – SPREAD SHEET VIEW



2.11. LOGICAL FUNCTION
2.11.7. AND FUNCTION

- Takes any number of parameters
- Returns TRUE if ALL of the parameters evaluate to TRUE otherwise returns FALSE.

2.11. LOGICAL FUNCTION
2.11.8. OR and NOT FUNCTIONS



2.11. LOGICAL FUNCTION
2.11.8. OR and NOT FUNCTIONS

OR

- Takes any number of parameters
- Returns TRUE if ANY of the parameters evaluate to TRUE otherwise returns FALSE

2.11. LOGICAL FUNCTION
2.11.8. OR and NOT FUNCTIONS Cont'd

NOT

- Takes ONLY ONE parameter
- Returns the "opposite" of the value of the parameter
  - returns FALSE if the parameter value is TRUE
  - returns TRUE if the parameter value is FALSE

EXAMPLES 2.12:
OF COMPLEX NESTED FUNCTION CALLS

- =IF(AND(A2>A3, OR(B2=B3,C2<C3)), 500, 1000)

  =IF(NOT(AND(A2>A3, OR(B2=B3,C2<C3))), 500, 1000)

- =IF(AND(A2>A3, NOT(OR(B2=B3,C2<C3))), 500, 1000)

ADVANCED Ms. EXCEL FORMULAS & CHARTS

3rd DAY SESSION

(25 February 2014)

3.1. OUTLINE

3.1. OUTLINE
3.2. INTRODUCTION
3.3. CORRELATION COEFFICIENT
3.4. CREATE A CHART USING THE CHART WIZARD
3.5. SCATTERPLOTS AND CORRELATIONS
3.6. VERTICAL LOOKUP FUNCTION
3.7. SLOPE AND INTERCEPT
3.8. FORECAST FUNCTION
3.9. DROP DOWN LIST
3.10. EXAMPLE OF N-VALUE CURVE AGAINST DEPTH
3.11. EXAMPLE OF BORING LOG

3.2. INTRODUCTION

- Excel supplies more than 350 functions organized into 10 categories:
  - Database, Date and Time, Engineering, Financial, Information, Logical, Lookup, Math, Text and Data, and Statistical functions
- You can use the Insert Function button on the Formula bar to select from a list of functions.
- A series of dialog boxes will assist you in filling in the arguments of the function and this process also enforces the use of proper syntax.

3.3. CORRELATION COEFFICIENT

- A “good” fit to data is relative
- The data should fit a mathematical model, and so an R^2 value of close to one is expected

- Consider a comparison of final exam scores in a class vs. homework averages

- We would expect that students who do well on HW will generally do well on the final exam, but there will be exceptions

3.3. CORRELATION COEFFICIENT Cont'd

- The *correlation coefficient* (R^2) is a measure of how well the trendline fits the data
- A value of one represents a perfect fit
- In our example, the line fit is very good

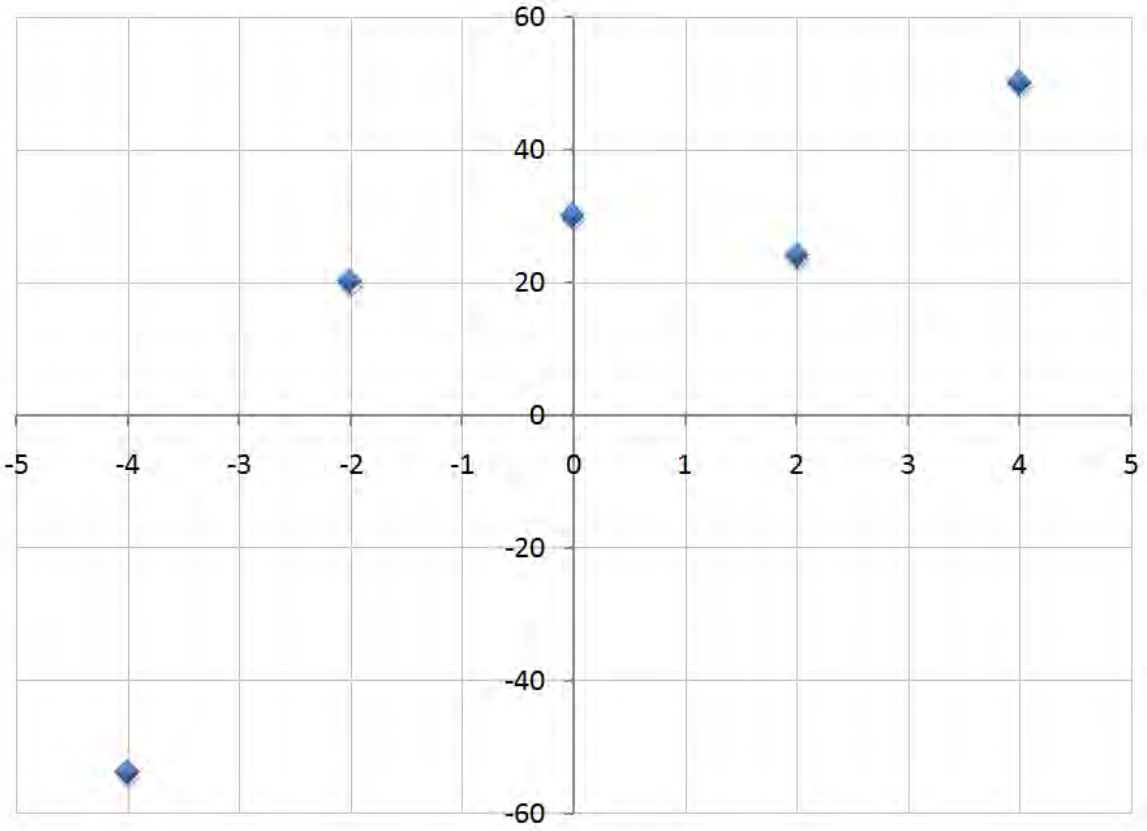
$$y = 72.28x + 23.13$$

$$R^2 = 0.998$$

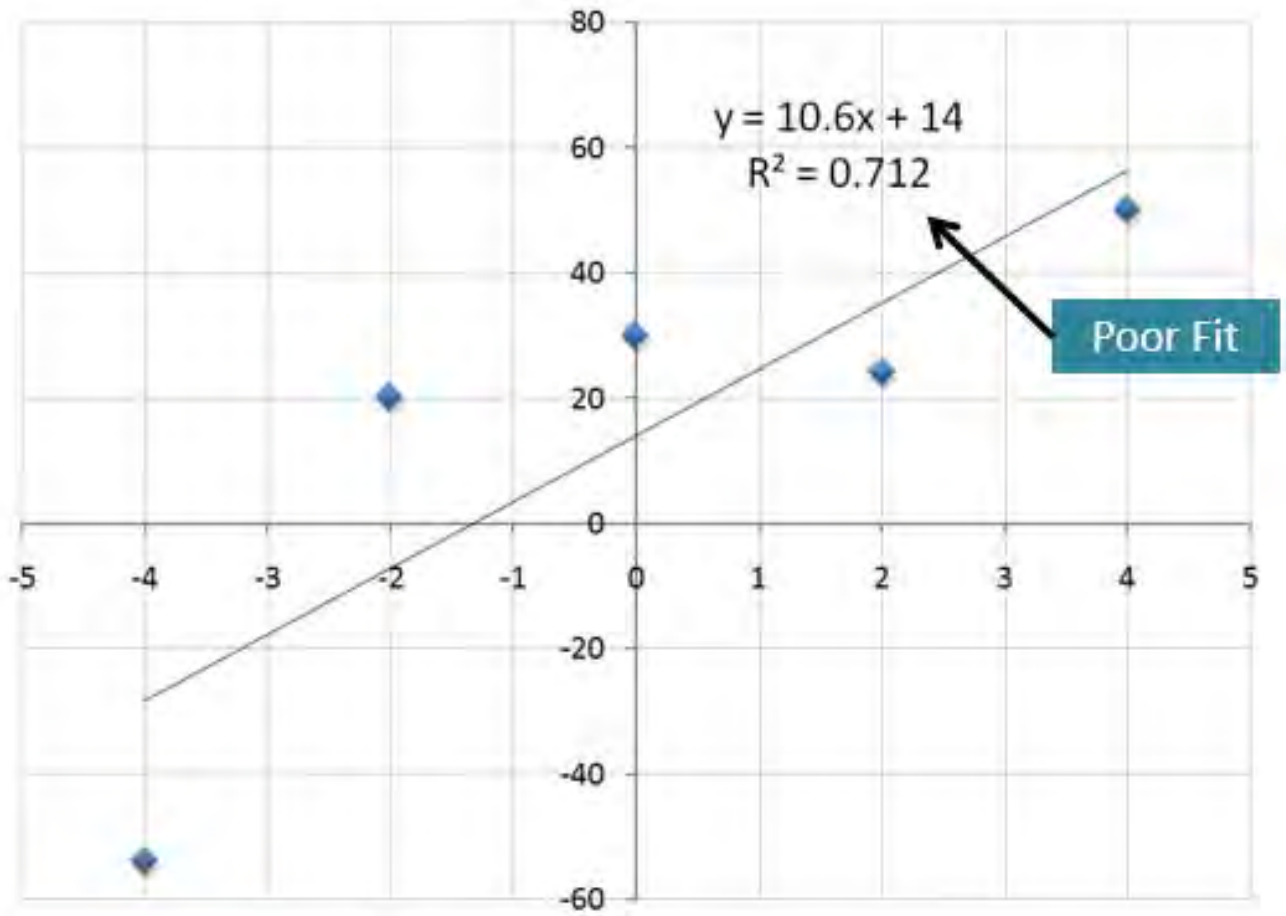
EXAMPLE 3.1:
CURVE FITTING

- Consider these five data points:

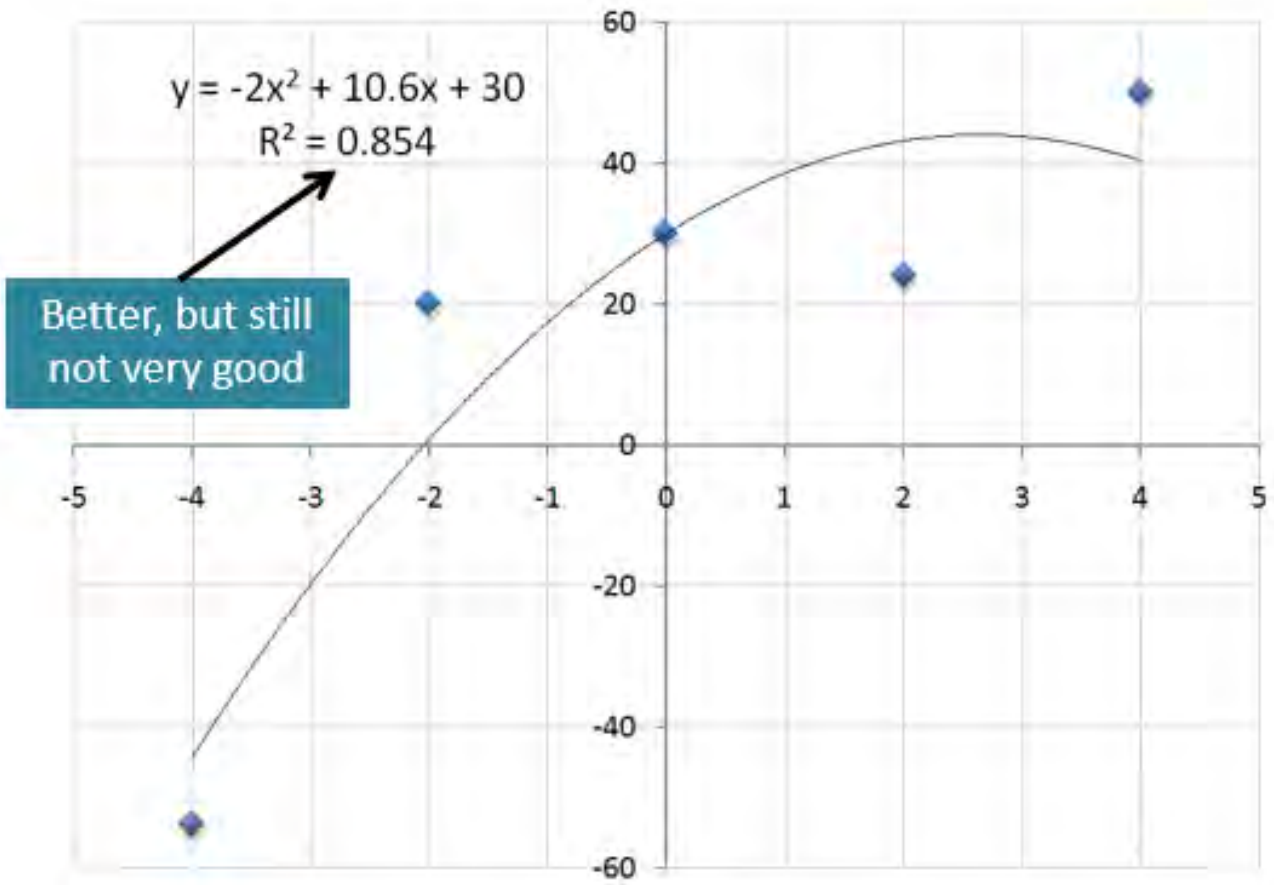
x	y
-4	-54
-2	20
0	30
2	24
4	50



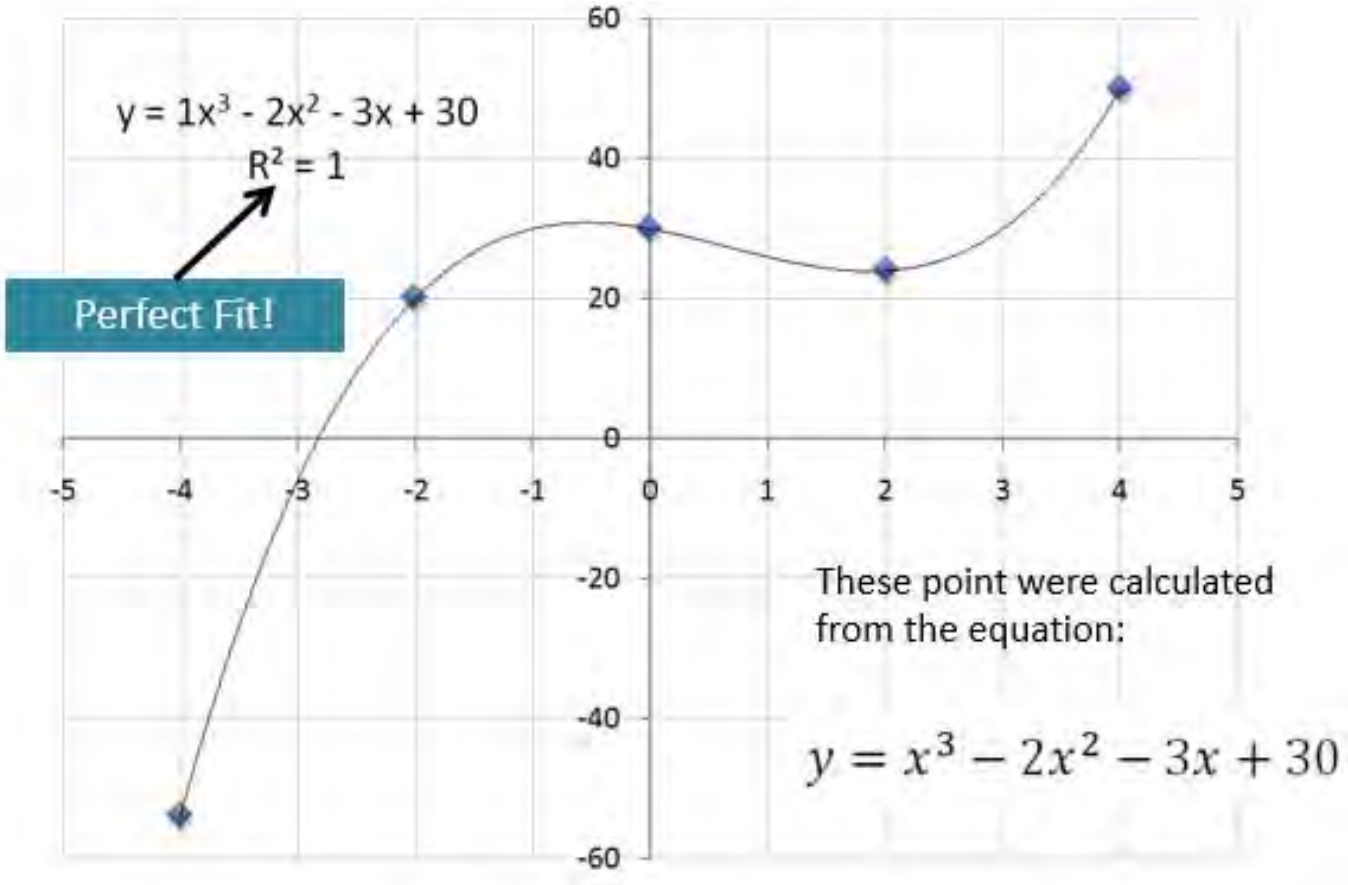
EXAMPLE 3.1
LINEAR CURVE FIT Cont'd



EXAMPLE 3.1
TRY SECOND ORDER POLYNOMIAL FIT Cont'd:



EXAMPLE 3.1
THIRD-ORDER POLYNOMIAL FIT Cont'd



3.4. GOAL SEEK

Excel's Goal Seek feature allows you to alter the data used in a formula in order to find out what the results will be. The different results can then be compared to find out which one best suits your requirements.

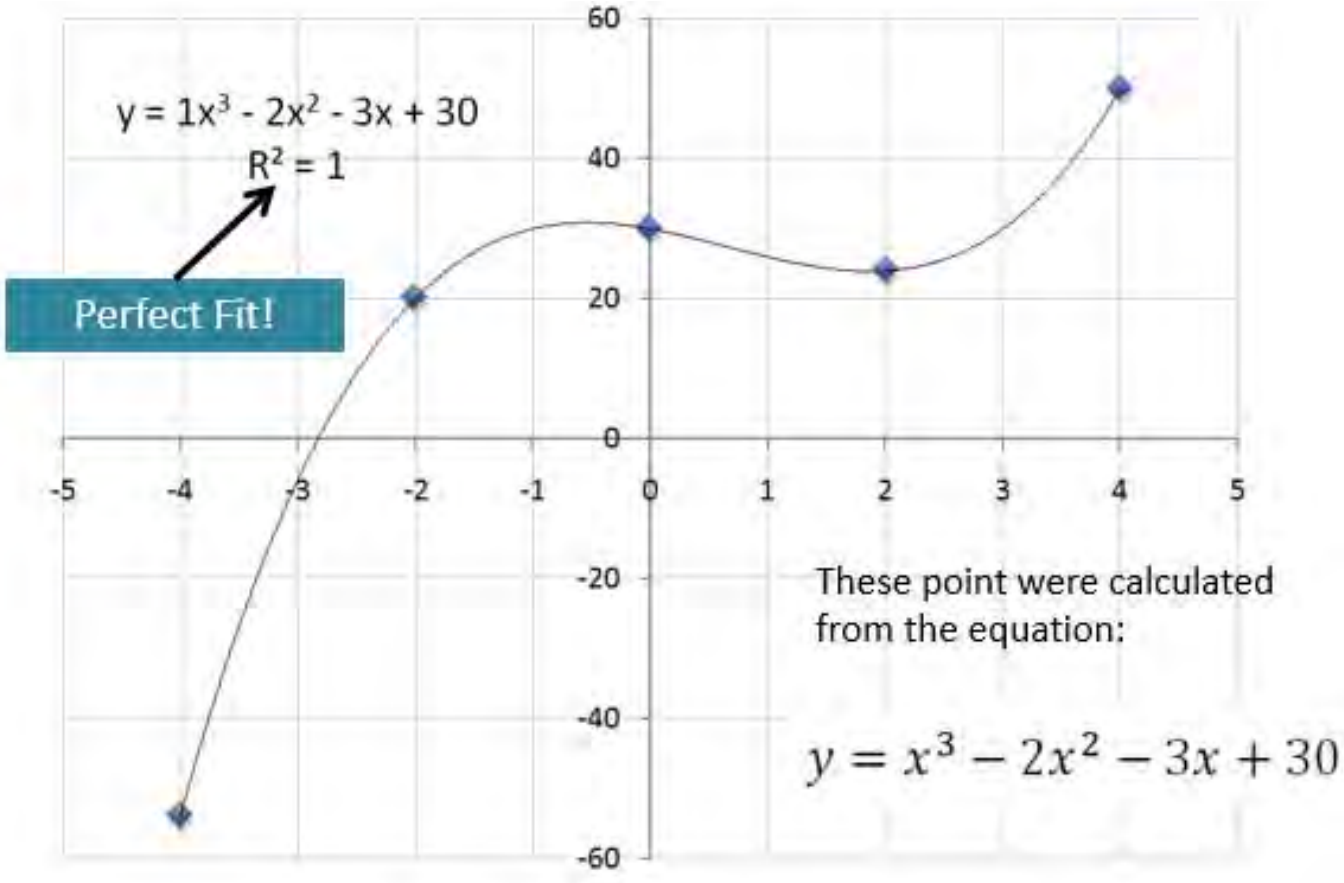
For this purpose find the X-Intercept or solve this Equation of order three.

$$Y = 1X^3 - 2X^2 - 3X + 30$$

$$Y = 1X^3 - 2X^2 - 3X + 30$$

	x	F (x)
By Goal Seek	-2.82	0.00

3.4. GOAL SEEK CONT'D



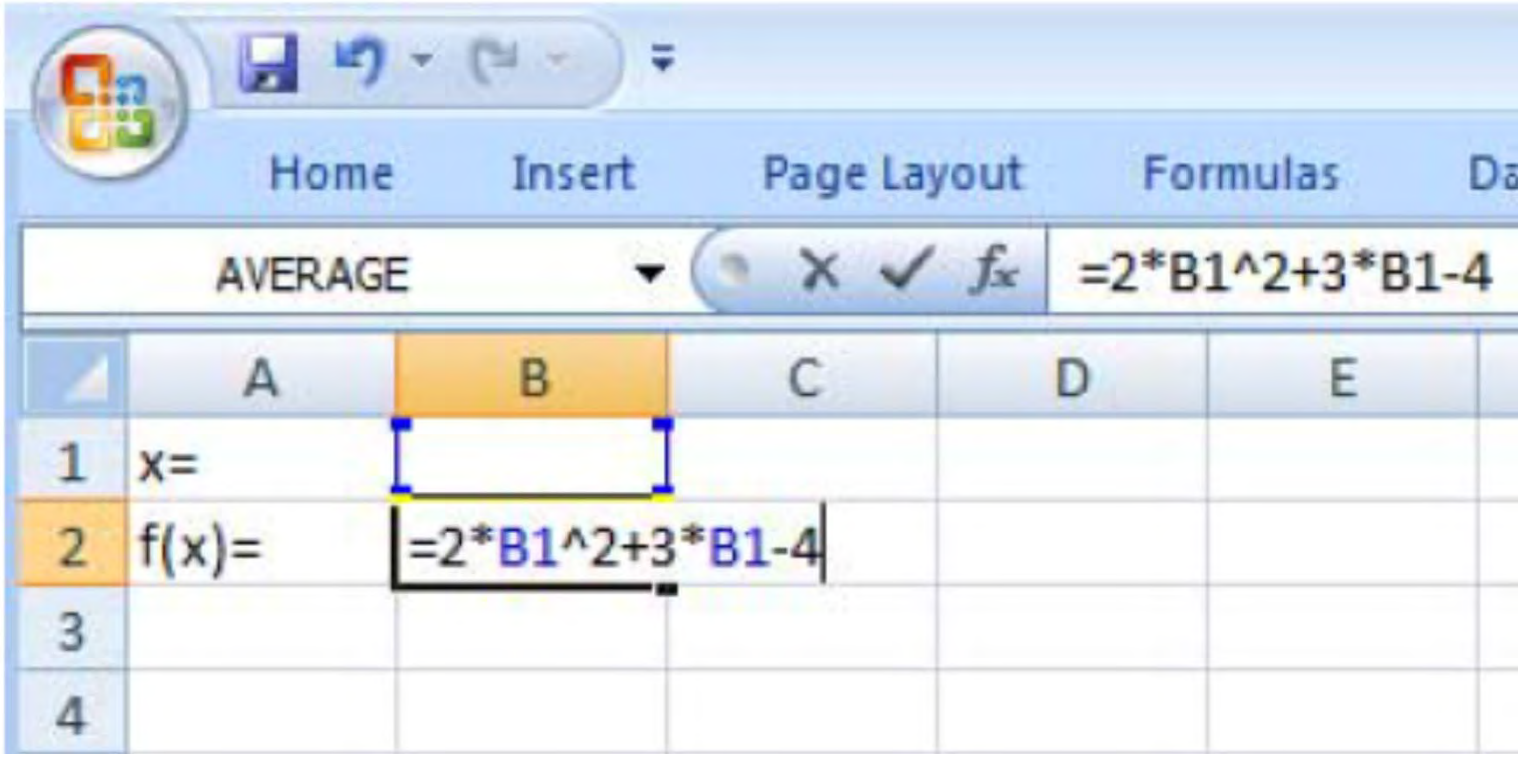
3.5. EQUATION SOLVER

Solve the equation $2x^2 + 3x - 4 = 0$

You will see in the following illustration, that the first step of all Excel solutions is to correctly define the function we want to find

the root of, and to assign the variable to one specific cell.

3.5. EQUATION SOLVER Cont'd

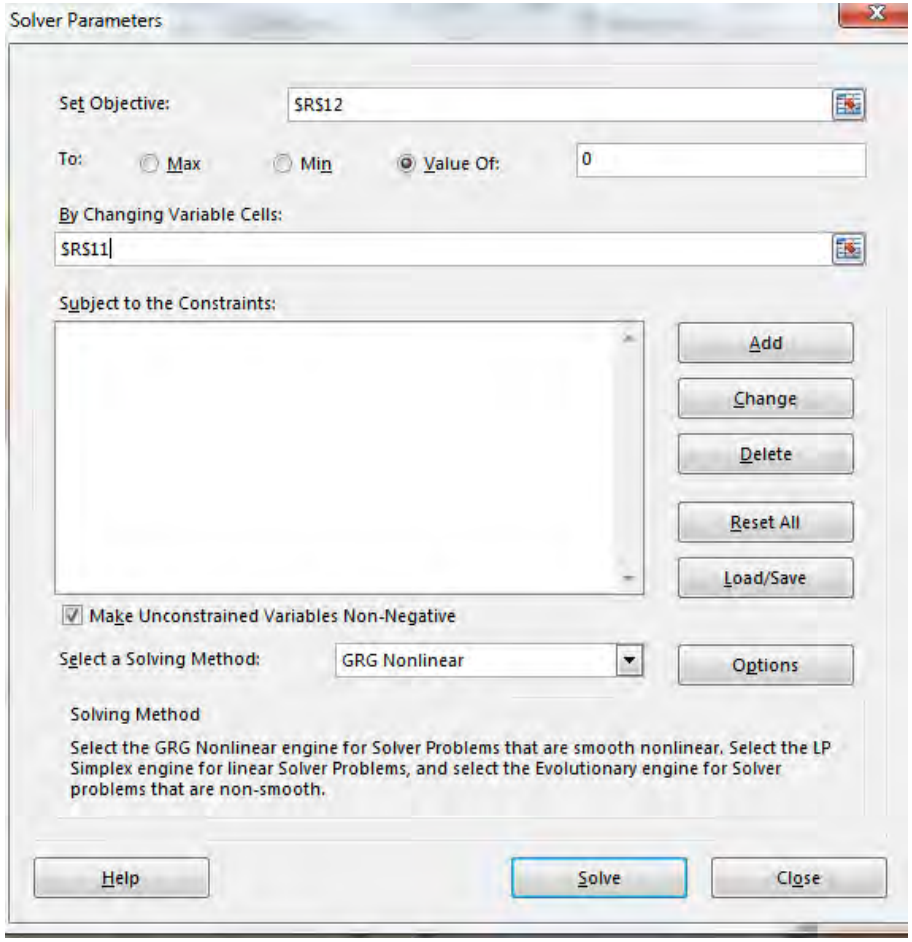


3.5. EQUATION SOLVER Cont'd

We assigned the cell B1 to contain the value of variable ***x***. In cell B2, we define the function. Note that B1 *plays the part of* x in the formula. By inserting values in cell B1, you will notice that the result of the function will change. Therefore, finding the root of a function implies finding the value of x such that the function is zero. Our goal is to have cell B1 vary (the value of ***x***) until the cell B2 (that contains the value of the function) is 0.

3.5. EQUATION SOLVER Cont'd

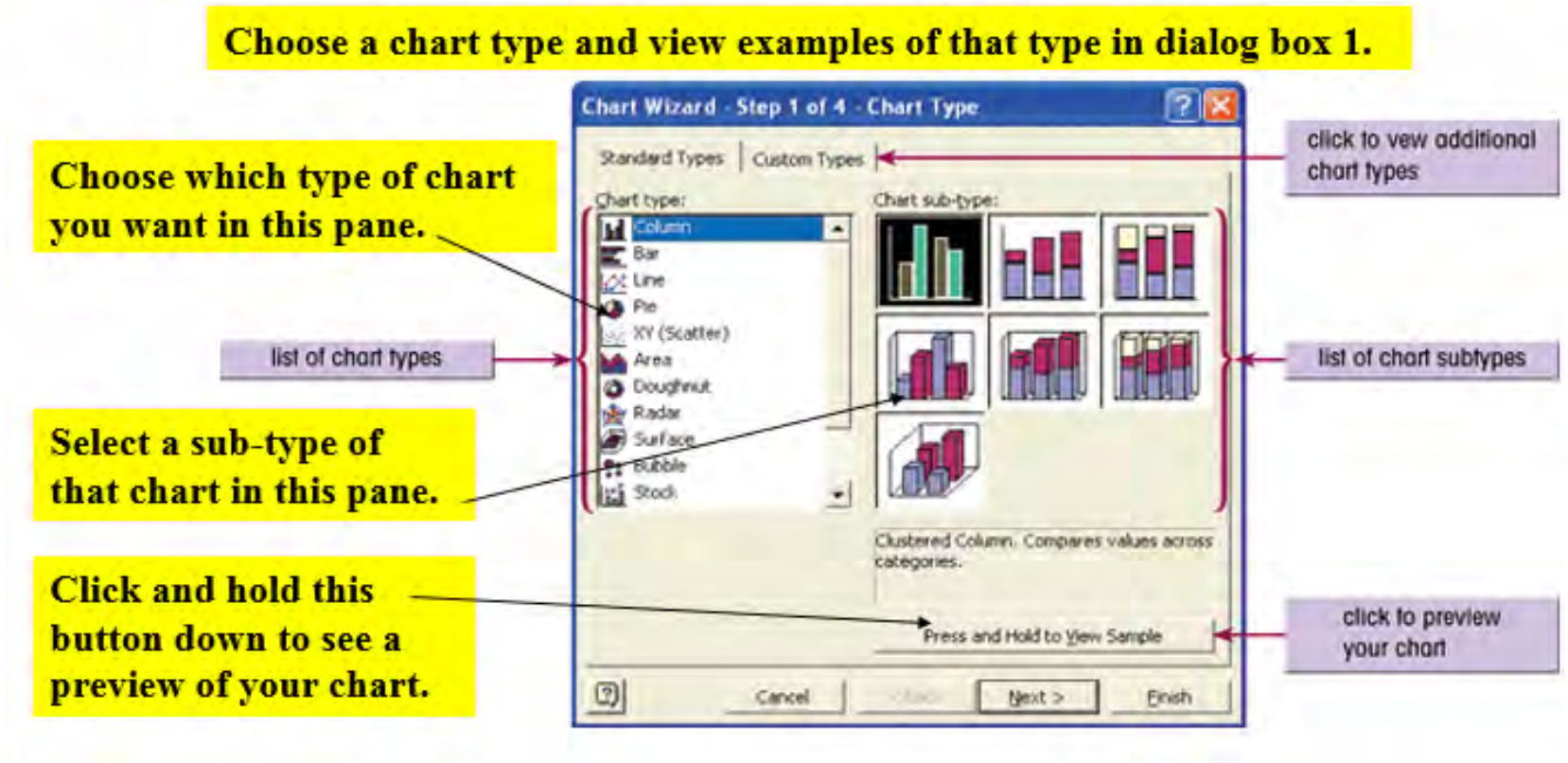
It would be too long to find an answer by trial and error. Select in Excel the function Solver (Tools menu). This dialog box will appear, and proceed accordingly.



3.6. CREATE A CHART USING THE CHART WIZARD

- To create a chart with the Chart Wizard:
  - Select the data you want to chart, which will be your data source
  - Click the Chart Wizard button on the standard toolbar
  - In the first step of the chart wizard, select the chart type and sub-type
  - In the second step of the Chart Wizard, make any additions or modifications to the chart's data source
  - In the third step, make any modifications to the chart's appearance
  - In the fourth and final step, specify the location for the chart, then click the OK button

3.6.1. CHART WIZARD DIALOG BOX



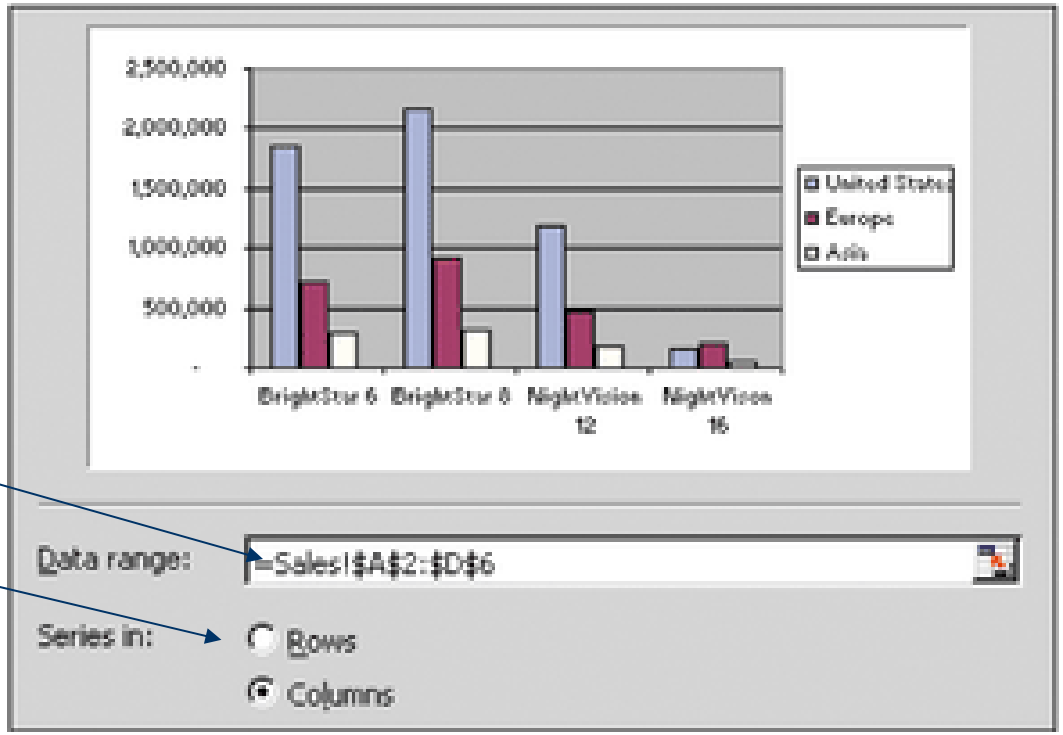
3.6.2. CHOOSING A DATA SERIES

- You can alter the data source during step 2 of the Chart Wizard and also choose whether to organize the data source by rows or by columns.
- The data source is organized into a collection of data series.
  - A data series consists of data values, which are plotted on the chart's vertical, or Y-axis
  - The data series' category values, or X values, are on the horizontal axis, called the X-axis
- A chart can have several data series all plotted against a common set of category values.

3.6.2. CHOOSING A DATA SERIES Cont'd

During the second step of the Chart Wizard, you specify the data to be displayed in the chart, which is also known as the chart's data source.

Specify the cell range and whether the data series is in rows or columns.



EXAMPLE 3.2:
DATA SERIES EXAMPLES

	Number of Candies
Blue	23
Green	35
Red	56
Orange	54

This spreadsheet has one data series in a column: Number of candies

	Bag #1	Bag #2	Bag #3
Blue	23	33	43
Green	35	22	24
Red	56	19	56
Orange	54	20	44

This spreadsheet has three data series in columns: Bag #1, Bag #2, and Bag #3

OR

This spreadsheet has four data series in rows: Blue, Green, Red, Orange.

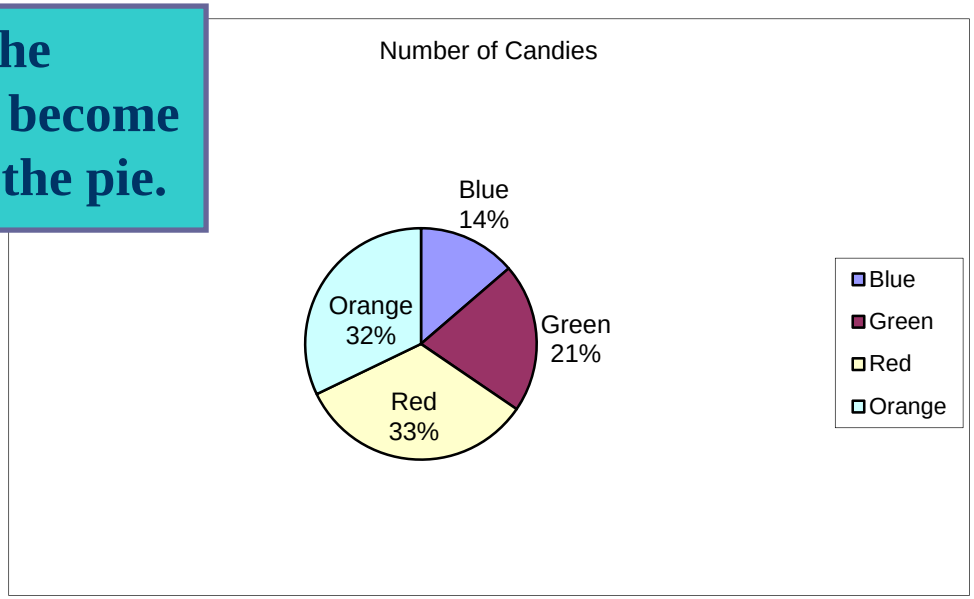
EXAMPLE 3.2:
DATA SERIES EXAMPLES Cont'd

	Number of Candies
Blue	23
Green	35
Red	56
Orange	54

The title comes from this cell.

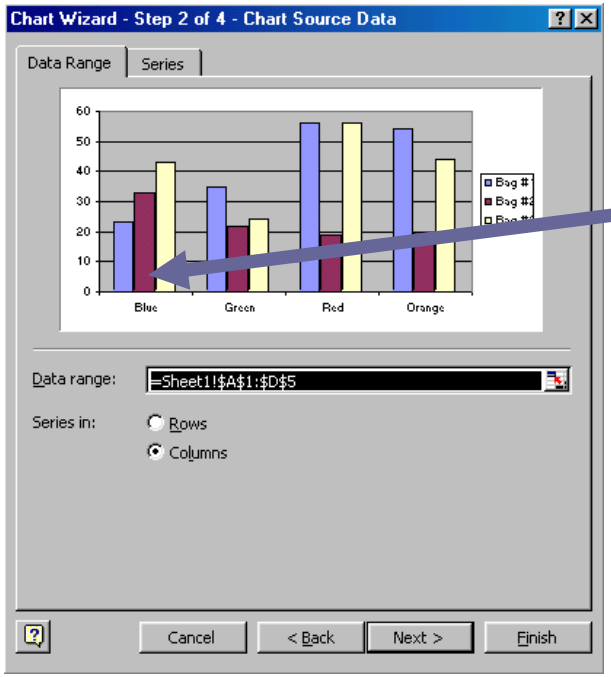
Each of the numbers become a slice of the pie.

The legend and labels come from the first column.

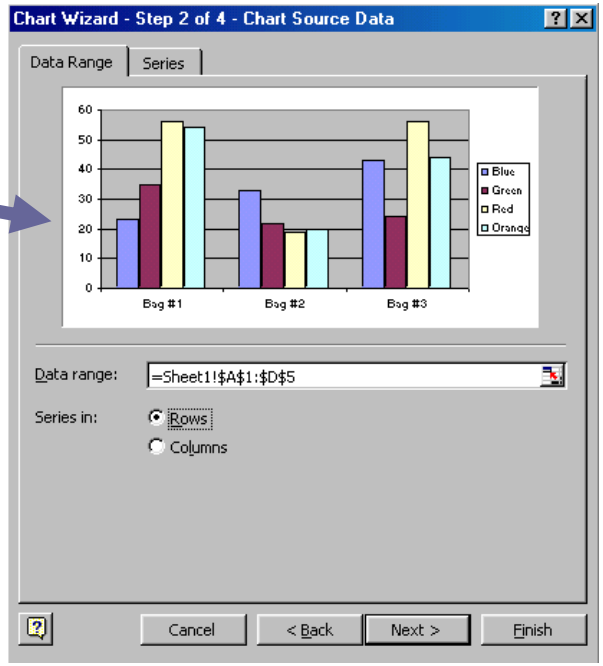


EXAMPLE 3.2:
DATA SERIES EXAMPLES Cont'd

	Bag #1	Bag #2	Bag #3
Blue	23	33	43
Green	35	22	24
Red	56	19	56
Orange	54	20	44



The same set of data can yield two different bar charts if the data series are in rows or columns.



3.7. SCATTERPLOTS AND CORRELATIONS

A quick review:

- Every correlation has a *direction* (positive or negative):
  - + correlation: **high** scores on one variable are associated with **high** scores on another variable.
  - - correlation: **high** scores on one variable are associated with ***low*** scores on the other variable.
- Every correlation has a *magnitude* or *strength*:
  - The closer the correlation coefficient is to +1.00 or -1.00, the **stronger** it is.
  - The closer the correlation coefficient is to 0.00, the **weaker** it is.

3.7.1. CACULATING PEARSON'S "r" Value

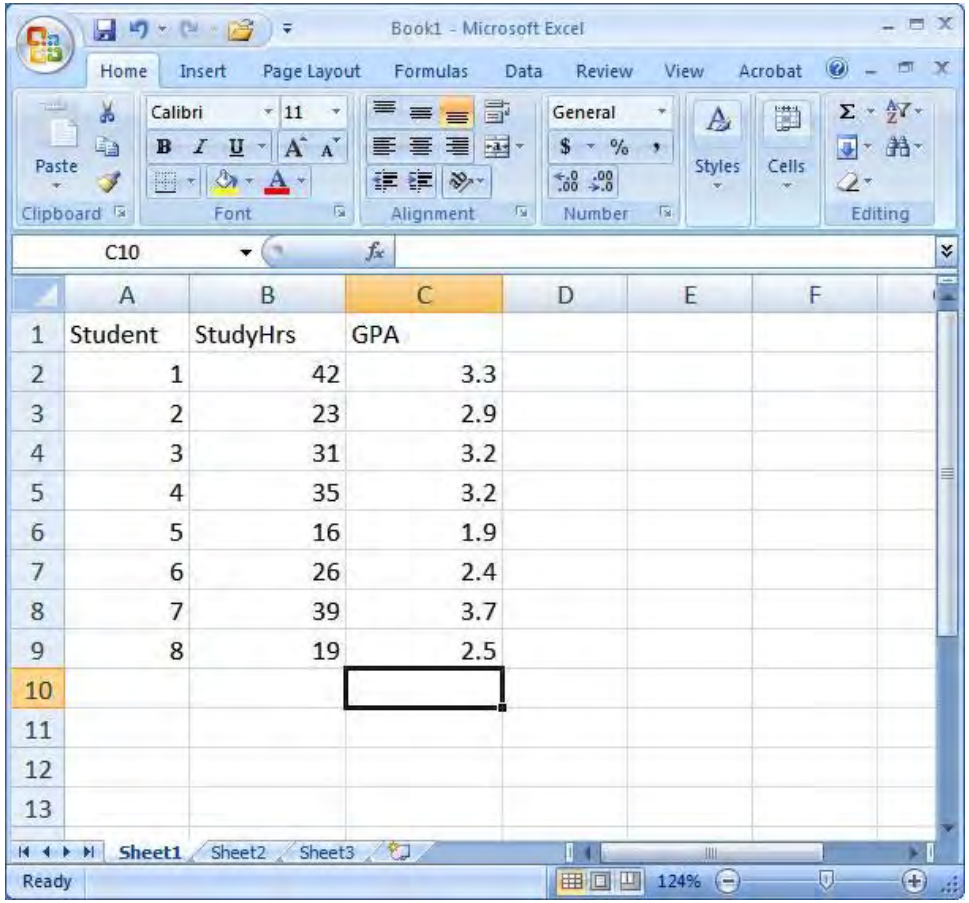
- Correlations are described using the Pearson Product-Moment correlation statistic, or *r* value.
- In Excel, there are many functions that can calculate a correlation statistic, however, we will only use =PEARSON in this class.

Let's say we want to determine if there is a relationship between number of hours spent per week studying for Psych 209 and GPA earned in the class at the end of the quarter. To do so, we can calculate Pearson's *r* for our two variables.

EXAMPLE 3.4:
ENTERING STUDY HOURS AND GPA INTO EXCEL

StudyHrs = average number of hours spent per week studying for 209

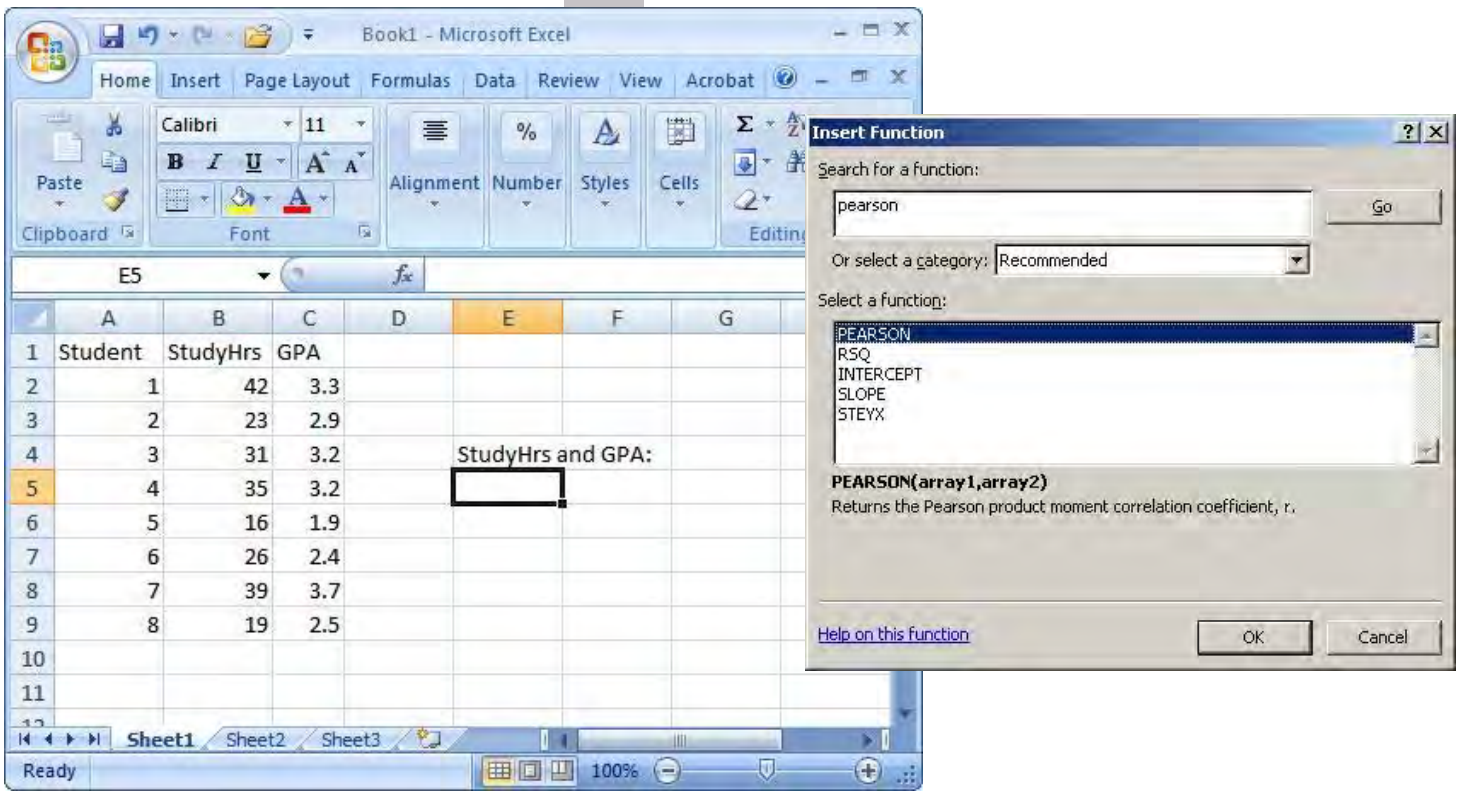
GPA = grade-point average earned in 209 at the end of the quarter



EXAMPLE 3.5:
ENTERING STUDY HOURS AND GPA INTO EXCEL Cont'd

Step 1: Select the cell where you want your *r* value to appear (you might want to label it).

Step 2: Click on the function wizard f_x button. Step 3: Search for and select PEARSON.

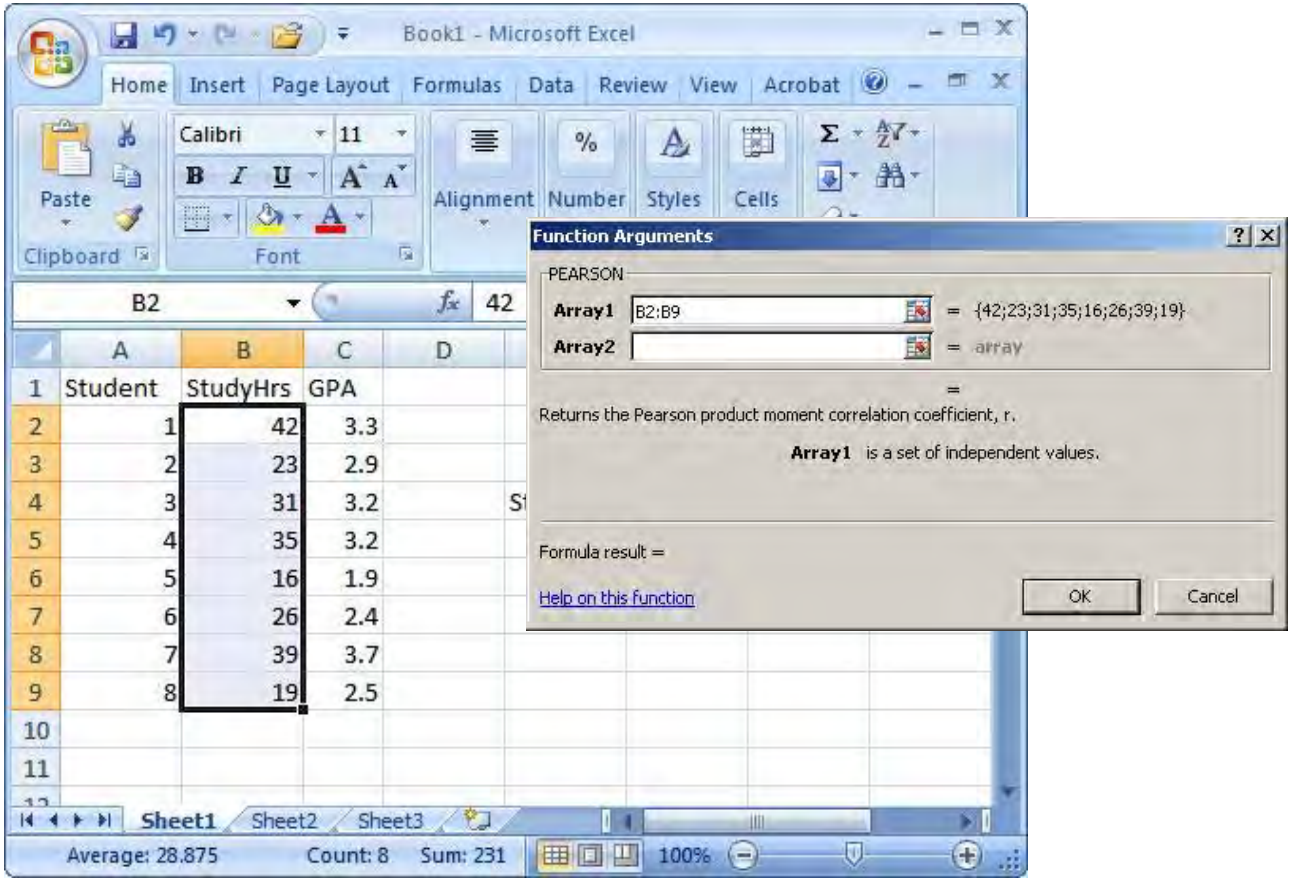


EXAMPLE 3.5:
ENTERING STUDY HOURS AND GPA INTO EXCEL Cont'd

Step 4:

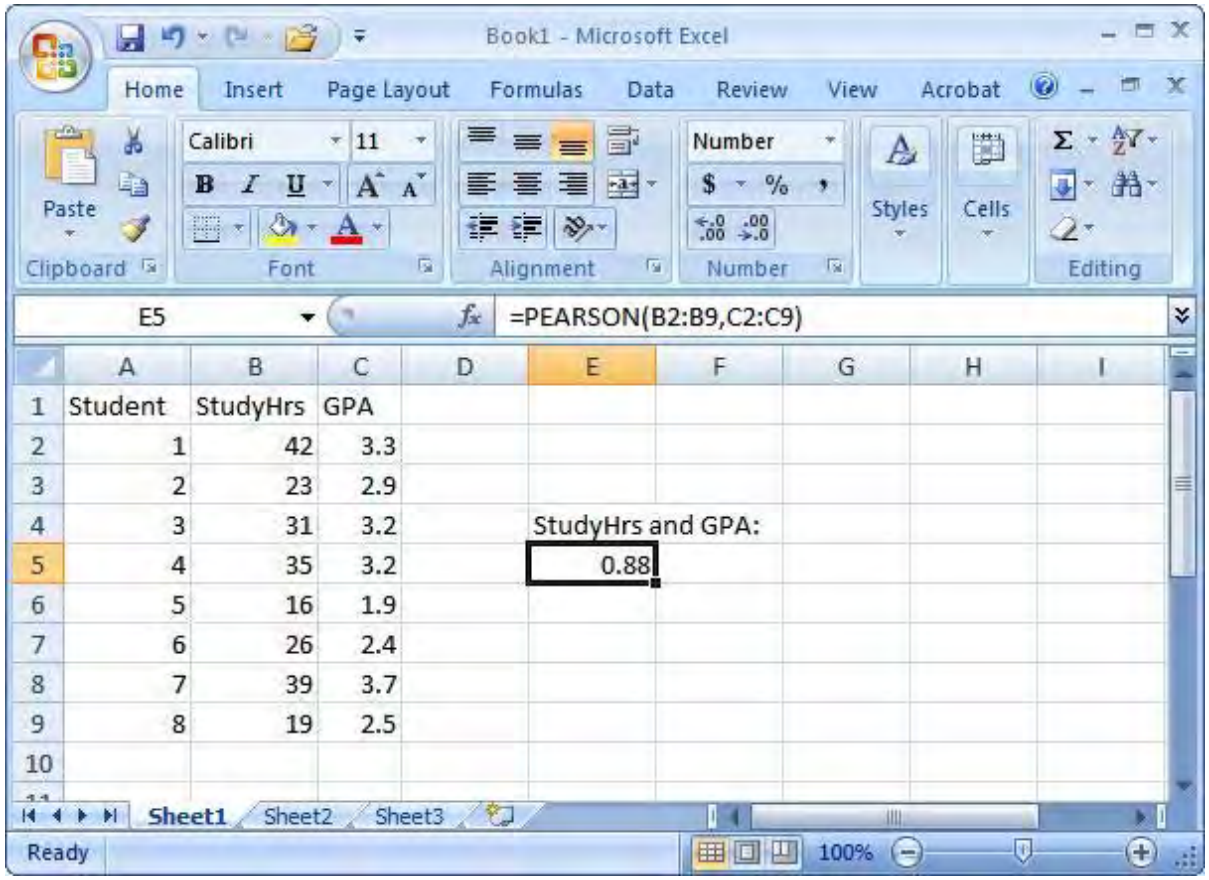
For Array1, select all the values under StudyHrs.

For Array2, select all the values under GPA.



EXAMPLE 3.5:
ENTERING STUDY HOURS AND GPA INTO EXCEL Cont'd

Step 5: That's it! Once you have your *r* value, don't forget to round to 2 decimal places.



Knowledge check:

What does the r value of 0.88 tell you about the strength and direction of the correlation between StudyHrs and GPA?

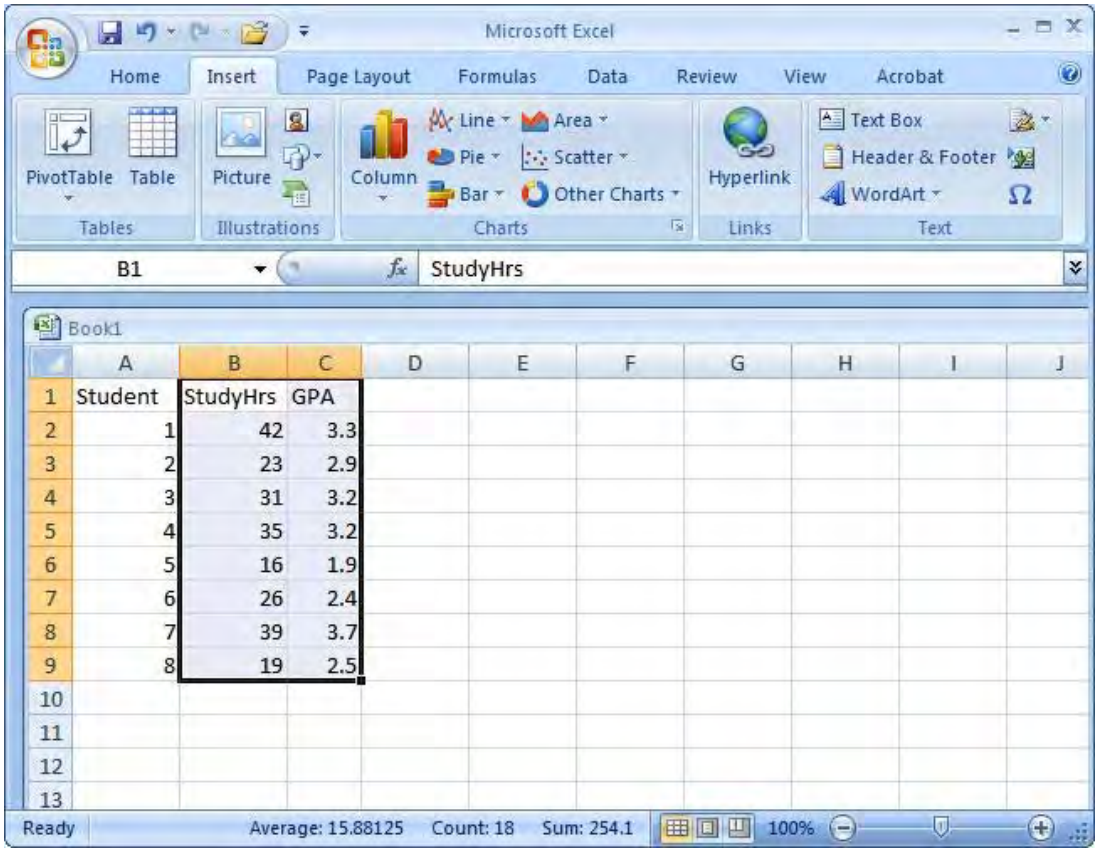
EXAMPLE 3.6:
SCATTER PLOTS

- A scatterplot is an excellent way to visually display the relationship (correlation) between two variables.
- Each point on the scatterplot represents an individual's data on the two variables.

- We will now create a scatterplot for StudyHrs and GPA.

EXAMPLE 3.6:
SCATTER PLOTS Cont'd

Step 1: Select both columns of variables you wish to plot (StudyHrs and GPA).
Step 2: Click on the tab labeled 'Insert', and then select 'Scatter' in the 'Charts' menu.

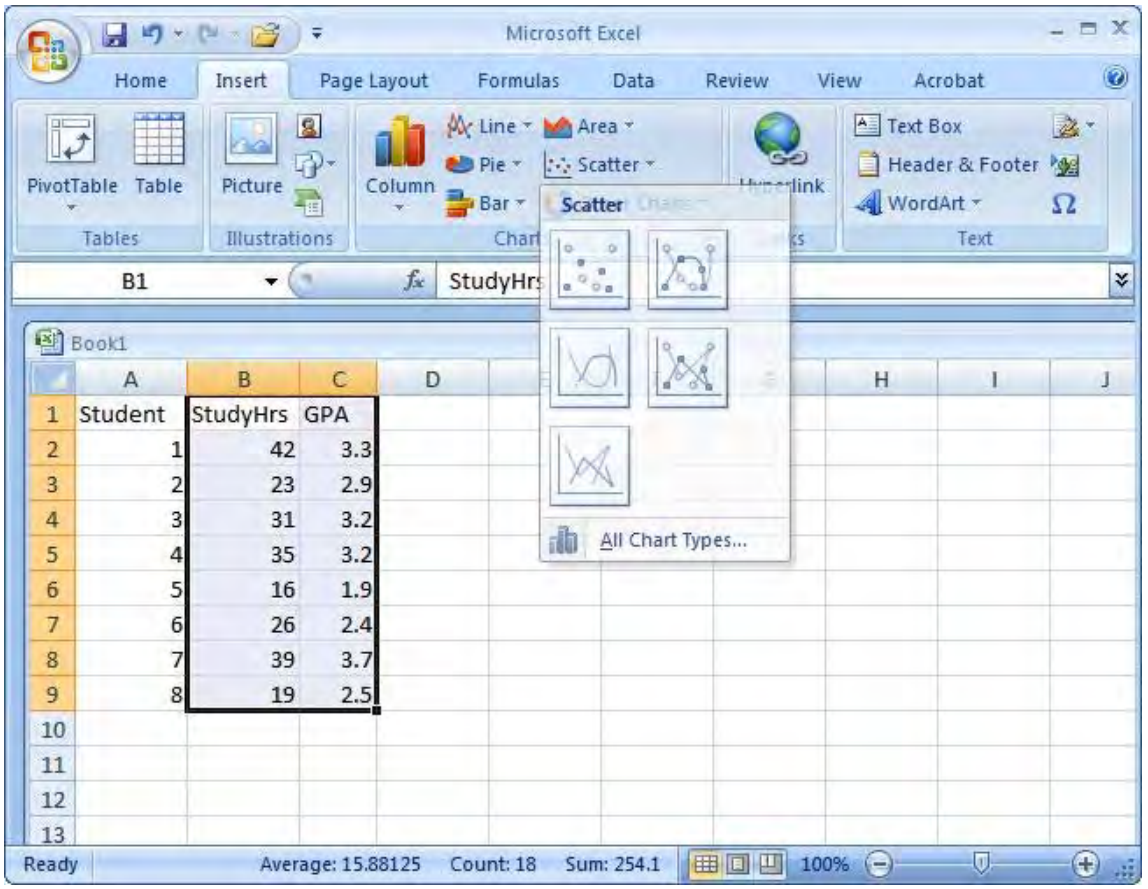


	A	B	C	D	E	F	G	H	I	J
1	Student	StudyHrs	GPA							
2	1	42	3.3							
3	2	23	2.9							
4	3	31	3.2							
5	4	35	3.2							
6	5	16	1.9							
7	6	26	2.4							
8	7	39	3.7							
9	8	19	2.5							
10										
11										
12										
13										

EXAMPLE 3.6:
SCATTER PLOTS Cont'd

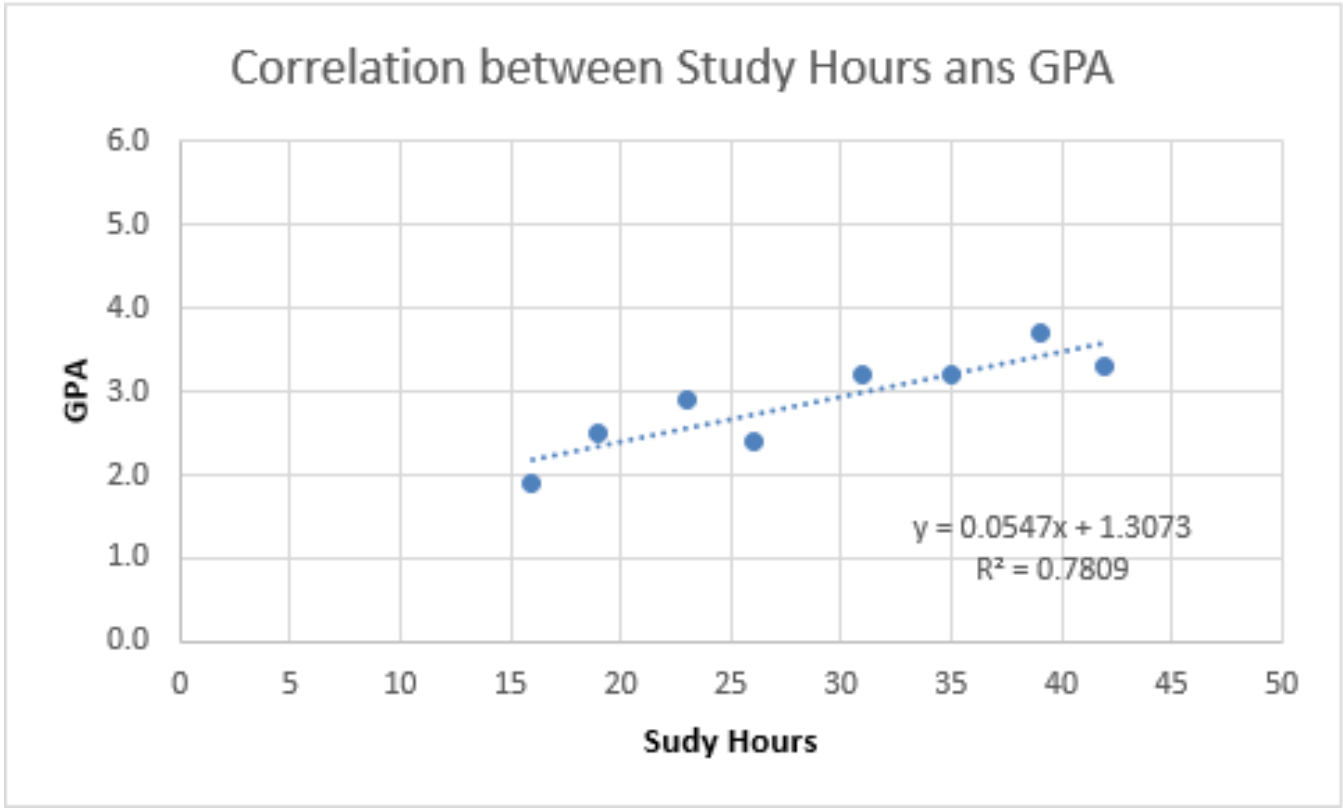
Step 3:

Select the first plot in the drop down menu.



EXAMPLE 3.6:
SCATTER PLOTS Cont'd

Step 4:



3.8. VERTICAL LOOKUP FUNCTION

You can use the **VLOOKUP** function to search the first column of a range (range: Two or more cells on a sheet. The cells in a range can be adjacent or nonadjacent.) of cells, and then return a value from any cell on the same row of the range. For example, suppose that you have a list of employees contained in the range A2:C10. The employees' ID numbers are stored in the first column of the range, as shown in the following illustration.

EXAMPLE 3.7:
VERTICAL LOOKUP

For example, suppose that you have a list of employees contained in the range A2:C10. The employees' ID numbers are stored in the first column of the range, as shown in the following illustration.

EXAMPLE 3.7:
VERTICAL LOOKUP Cont'd

	A	B	C
1	**Employee ID**	**Department**	**Full Name**
2	35	Sales	Yossi Banai
3	36	Production	Nicole Bousseau
4	37	Sales	Aik Chen
5	38	Operations	Axel Delgado
6	39	Sales	Suroor Fatima
7	40	Production	Gerhard Goeschl
8	41	Sales	Andreas Hauser
9	42	Operations	Nattorn Jayanama
10	43	Production	Jim Kim

EXAMPLE 3.7:
VERTICAL LOOKUP Cont'd

If you know the employee's ID number, you can use the VLOOKUP function to return either the department or the name of that employee. To obtain the name of employee number 38, you can use the formula:

- ***=VLOOKUP(38, A2:C10, 3, FALSE).***
- This formula searches for the value 38 in the first column of the range ***A2:C10***.

- And then returns the value that is contained in the third column of the range and on the same row as the lookup value **("Axel").**

EXAMPLE 3.7:
VERTICAL LOOKUP Cont'd

A frequent question is how to assign a letter grade to a numeric value. This is simple. First create a define name called "Grades" which refers to the array:

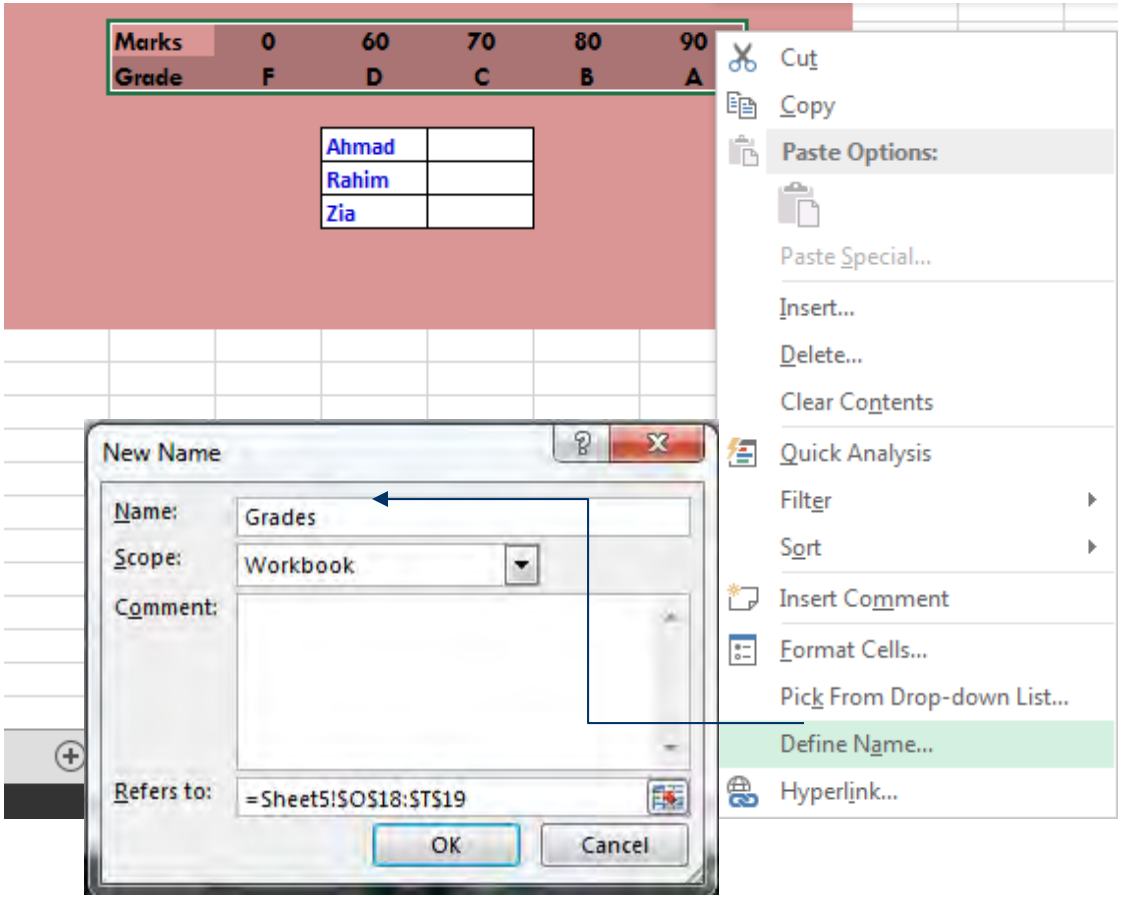
Marks	0	60	70	80	90
Grade	F	D	C	B	A

Then, use HLOOKUP to convert the number to the grade:

```
= VLOOKUP (A1, Grades,2)
```

EXAMPLE 3.8:
HORIZONTAL LOOK UP

- Select the entire array
- Right Click
- Click on Define Name
- Write “Grade” in Name Box



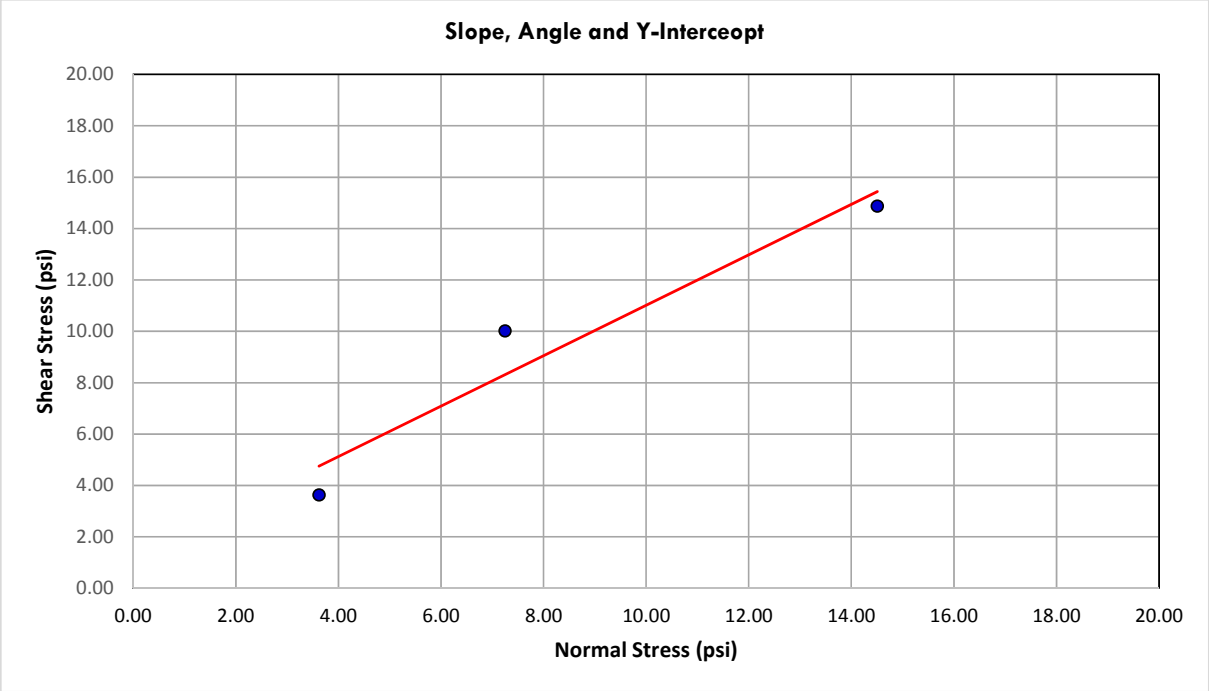
3.9. SLOPE AND INTERCEPT

Function	What it Does
SLOPE	Returns the slope of the regression line through the given data points =SLOPE(y cell range, x cell range) **=SLOPE(C2:C6,A2:A6)**
INTERCEPT	Calculates the point at which a line will intersect the y-axis using a best-fit regression line plotted through the known x values and y values =INTERCEPT(y cell range, x cell range) **=INTERCEPT(C2:C6,A2:A6)**
CORREL	Return the correlation coefficient between two data sets. =CORREL(y cell range, x cell range)

EXAMPLE 3.8:
SLOPE AND INTERCEPT

Direct Shear Test Result (ASTM D 3080)

Shear Stress (psi)	3.63	10.01	14.87
Normal Stress (psi)	3.63	7.25	14.50



EXAMPLE 3.8:
SLOPE AND INTERCEPT Cont'd

From previous Graph and Data Entry the following Results Came on.

Slope (m)	0.982	
or tan of (ϕ)	0.982	
Angle of (ϕ)	0.776	rad
Angle of (ϕ)	44.5	deg

Y-Intercept	1.19662	psi
or c (Cohesion)	1.19662	psi

Direct "ϕ" Determination in degree

Angle of (ϕ)	44.5	deg

3.10. FORECAST FUNCTION

Description

Calculates, or predicts, a future value by using existing values. The predicted value is a y-value for a given x-value. The known values are existing x-values and y-values, and the new value is predicted by using linear regression. You can use this function to predict future sales, inventory requirements, or consumer trends.

EXAMPLE 3.9:
FORECAST FUNCTION

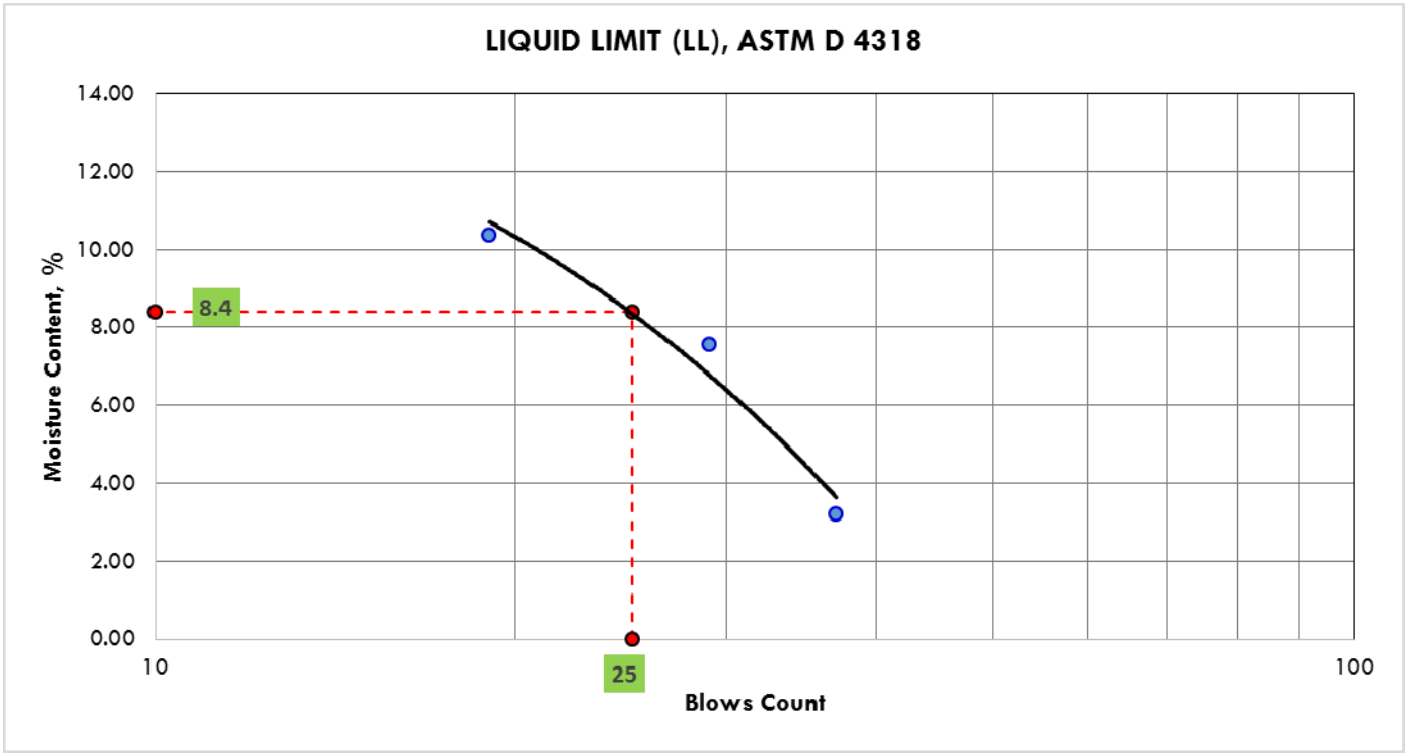
LL is a Moisture Content (%), at 25 Standard Blows Count), it is one of Fine-Grained Soil Test

Liquid Limit Test Result (ASTM D 4318)

Blows Count	37	29	19
Moisture Content	3.20	7.56	10.36

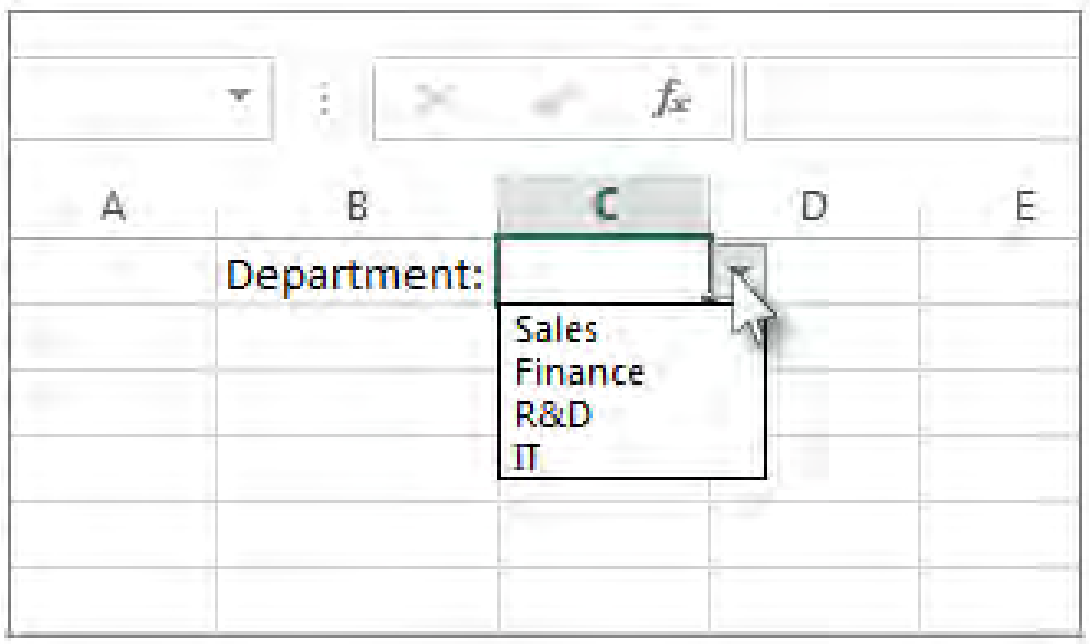
LL (By Forecast Function), %	8.35
LL (Determination from Curve), %	8.40

EXAMPLE 3.9:
FORECAST FUNCTION Cont'd



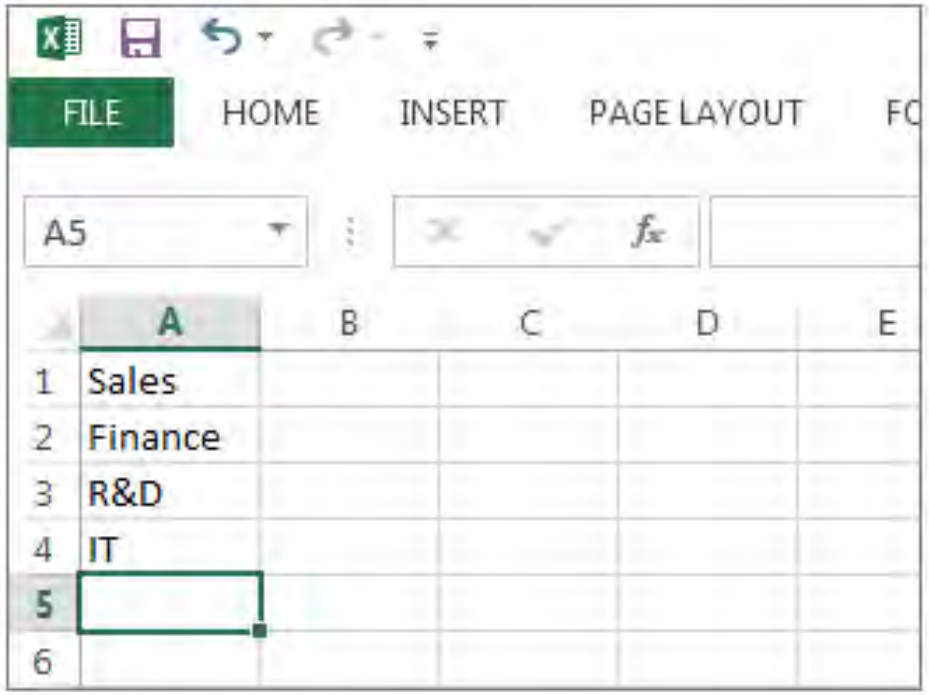
3.11. CREAT DROPDOWN LIST

You can make a worksheet more efficient by providing drop-down lists. Someone using your worksheet clicks an arrow, and then clicks an entry in the list.



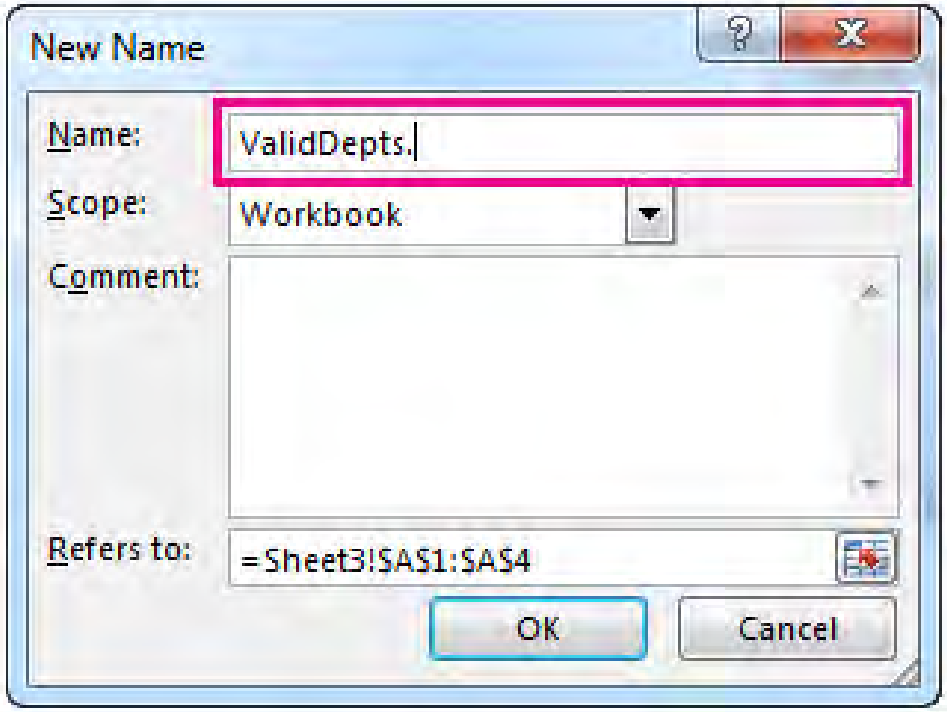
3.11. CREAT DROPDOWN LIST Cont'd

On a new worksheet, type the entries that you want to appear in your drop-down list. The entries should be in a single column or row without any blank cells, like this:



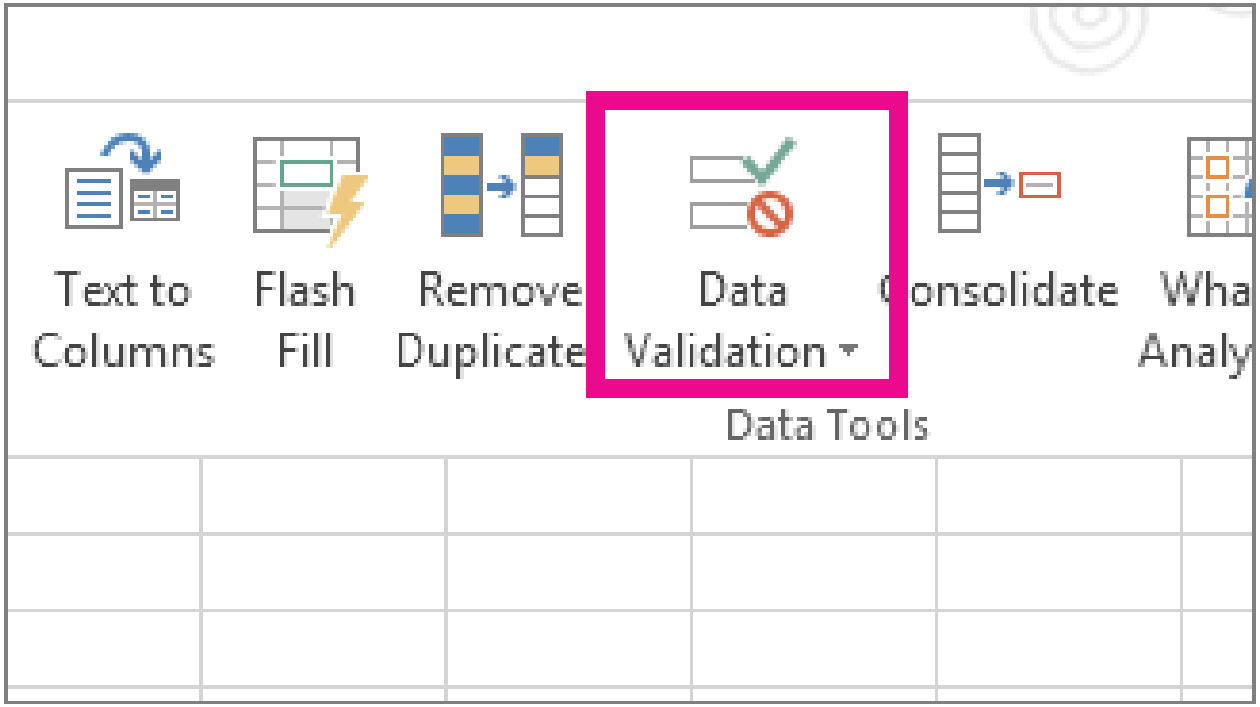
3.11. CREAT DROPDOWN LIST Cont'd

Select all of your entries, right-click, and then click **Define Name**. In the **Name** box, type a name for your entries, for example, **ValidDepts**, and then click **OK**. Be sure your name doesn't have any spaces in it. This name won't show up in your list, but you need to name it so you can link it to your drop-down list.

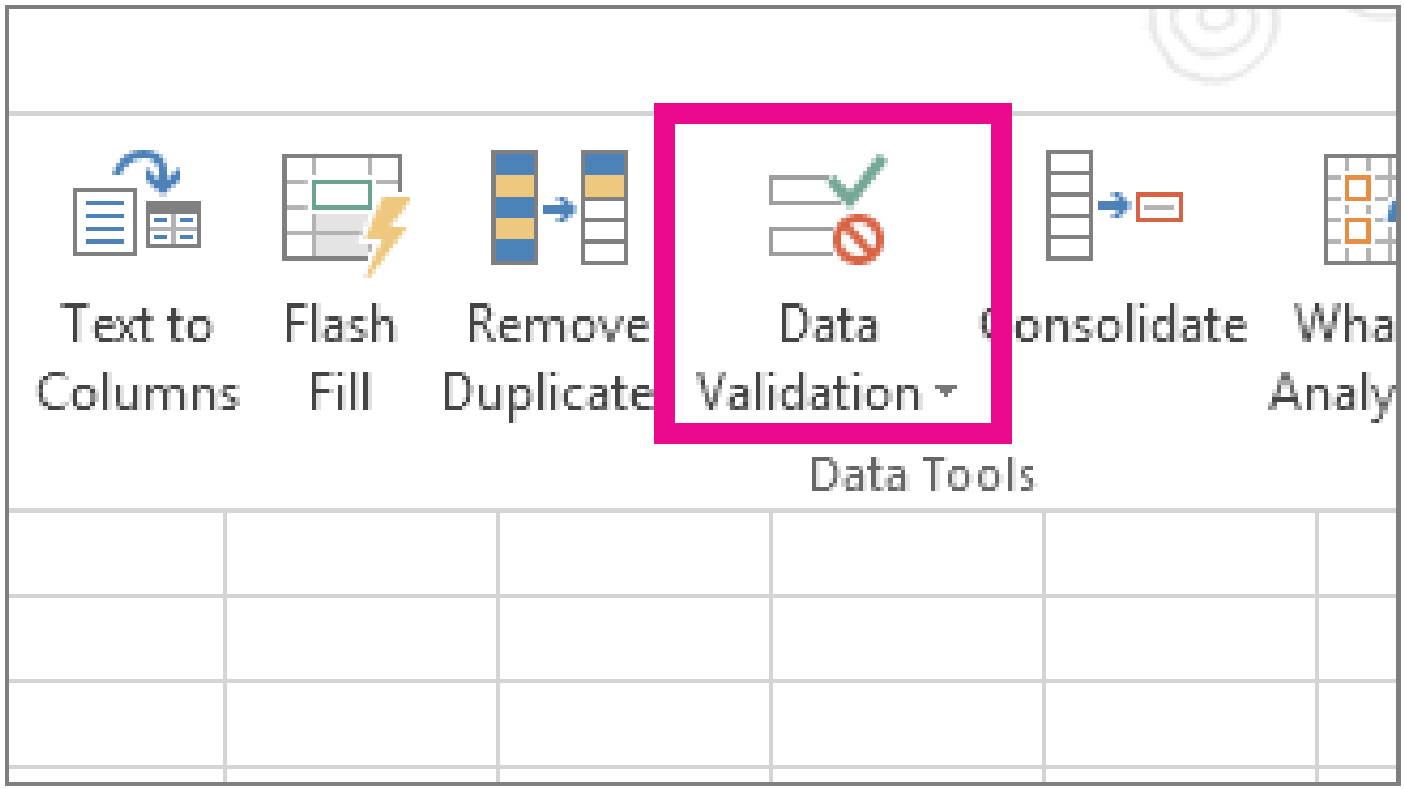


3.11. CREAT DROPDOWN LIST Cont'd

Click in the cell in the worksheet where you want the drop-down list. Click **Data** >**Data Validation**.

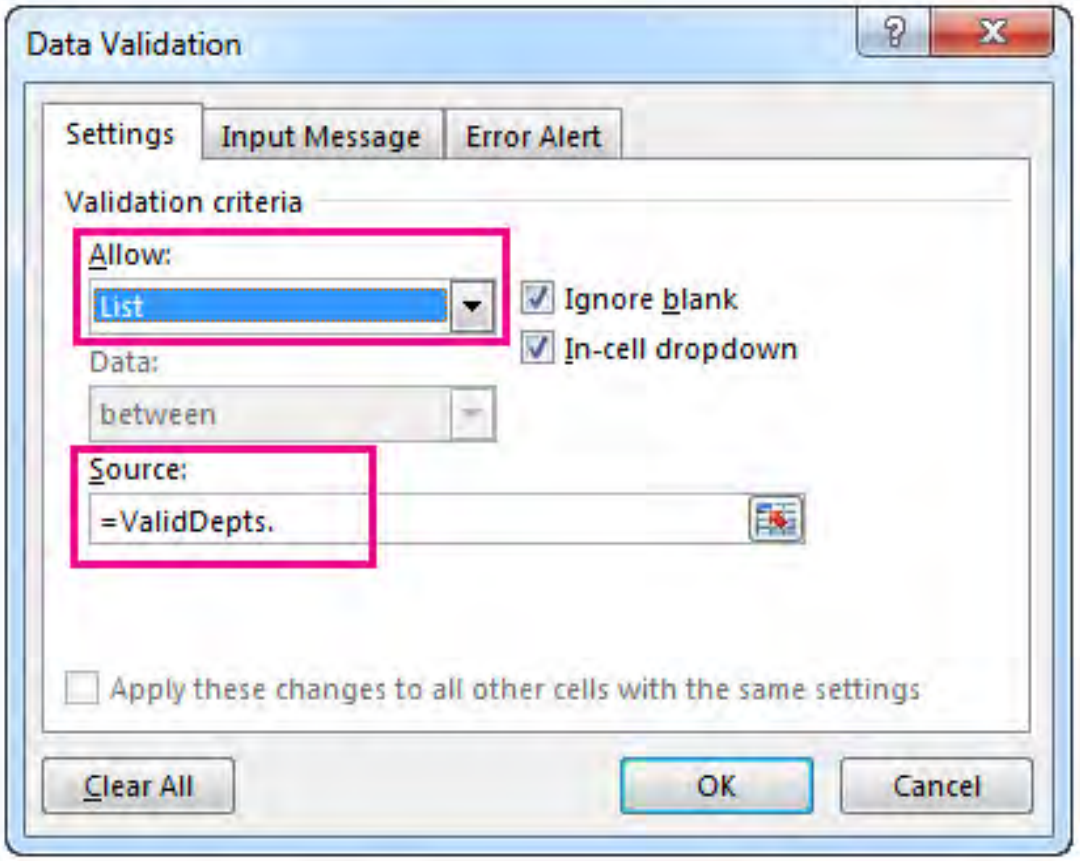


3.11. CREAT DROPDOWN LIST Cont’d



3.11. CREAT DROPDOWN LIST Cont'd

In the **Source** box, type and equal sign (=), immediately followed by the name you gave your list in step 3. For example, **=ValidDepts.**



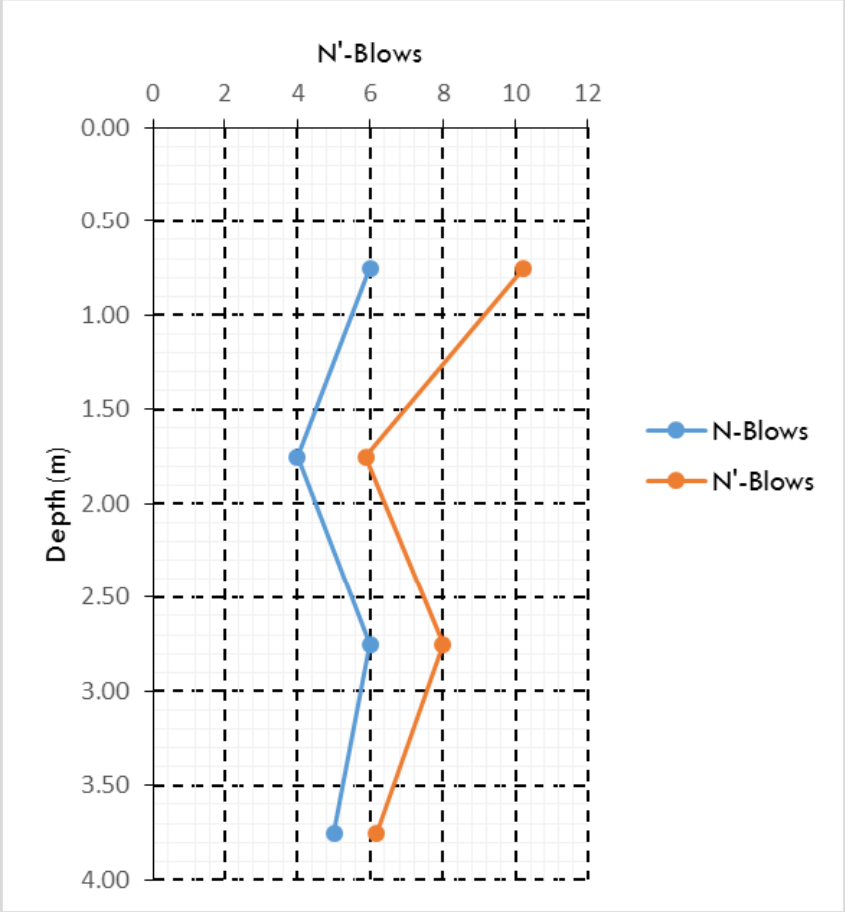
3.12. EXAMPLE OF N-VALUE CURVE AGAINST DEPTH

SPT TEST (ASTM D 1586):

This test method describes the procedure, generally known as the Standard Penetration Test (SPT), for driving a split-barrel sampler to obtain a representative soil sample and a measure of the resistance of the soil to penetration of the sampler.

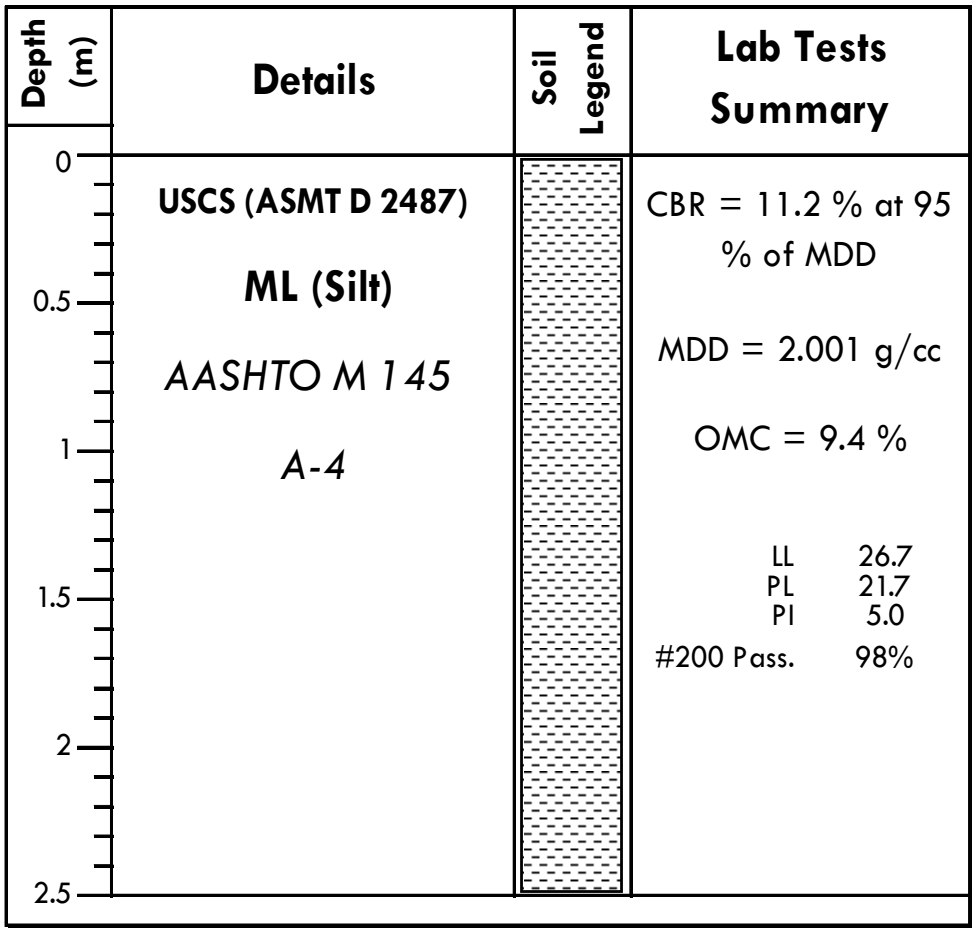
Draw the SPT “N” Value against depth

Depth	Pit_C	
m	N	N'
0.75	6	10
1.75	4	6
2.75	6	8
3.75	5	6



3.13. EXAMPLE OF BORING LOG

Boring Log is the type of information that should be recorded during field subsurface explorations in soil and rock.



END

THANKS

Atta Mohammad Mutmaeen

APPENDIX
MISCELLANEOUS

Some Useful Tips in MS. Excel

Applicable Engineering Fundamentals

Most engineering problems are based upon one of three underlying principles:

1. Equilibrium – Force, Flux, and Chemical
2. Conservation Laws – Energy and Mass
3. Rate Phenomena – How something changes over time.

Using Formulas

In Excel, a formula MUST always begin with an equal sign (=), followed by an expression involving:

- Constants
- Operators
- Cell Addresses

Consider: =(C3+B2+5)

- C3 & B2 are cell addresses
- 5 is the numerical constant
- The (+) sign is the operator

This formula could be entered in D7 where the formula would be applied. Note: Any change in C3 or B2 will automatically change D7!

Arithmetic Operators

Operator	Purpose	Example
+	Addition	A1+B1
-	Subtraction	A1-B1
*	Multiplication	A1*B1
/	Division	A1/B1
^	Exponentiation	A1^3
%	Percentage	A1%

Operator Preference

Since some formulas include more than one operator, the question arises as to which one is carried out first. The order is outlined to the right. If any formula has two operators from the same group, the order is carried out from left to right.

Operator Preference	Operator
1	%
2	^
3	* and /
4	+ and -

For example, in the formula =(C1/D2*E3), the division would be carried out first then multiplication.

Using Functions

Excel includes many different functions which can carry out a wide variety of operations.

They include:

- Mathematical and statistical operations
- Process financial data
- Process AND return text information

Each function has a specific name followed by an ARGUMENT enclosed in parenthesis.

Function Examples

- =Sum(C1,C2,C3) This will add the numbers in the three cell addresses. The ARGUMENT is inside the parenthesis and separated by commas.
- =Sum(C1:C50) the use of a COLON indicates a RANGE and will add up ALL cells between the two cell addresses.

A Simple Spreadsheet Application

A small machine shop has the following parts on hand:

Item	Quantity
Screws	6500
Nuts	9000
Bolts	5400

Start by creating a worksheet that includes this information, plus the total number of parts on hand. Answer the questions on the worksheet provided.

A tip of the trade

Time(s)	Distance(m)	Velocity
10	5	=B2/A2
20	15	
30	22	
40	36	
50	44	
60	52	
70	69	
80	78	
90	91	
100	106	

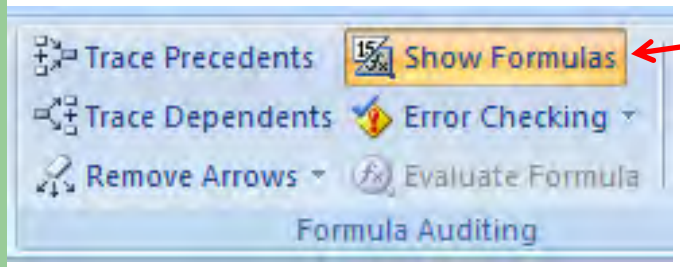
A formula can be copied by highlighting the cell and placing the mouse in the bottom right corner of the cell until a "+" appears.

With the mouse drag the "+" down to all the cells where you want the formula to be copied and hot enter. Excel will automatically change the cell address for you.

A tip of the trade

Time(s)	Distance(m)	Velocity
10	5	0.5
20	15	0.75
30	22	0.733333333
40	36	0.9
50	44	0.88
60	52	0.866666667
70	69	0.985714286
80	78	0.975
90	91	1.011111111
100	106	1.06

Time(s)	Distance(m)	Velocity
10	5	=B2/A2
20	15	=B3/A3
30	22	=B4/A4
40	36	=B5/A5
50	44	=B6/A6
60	52	=B7/A7
70	69	=B8/A8
80	78	=B9/A9
90	91	=B10/A10
100	106	=B11/A11



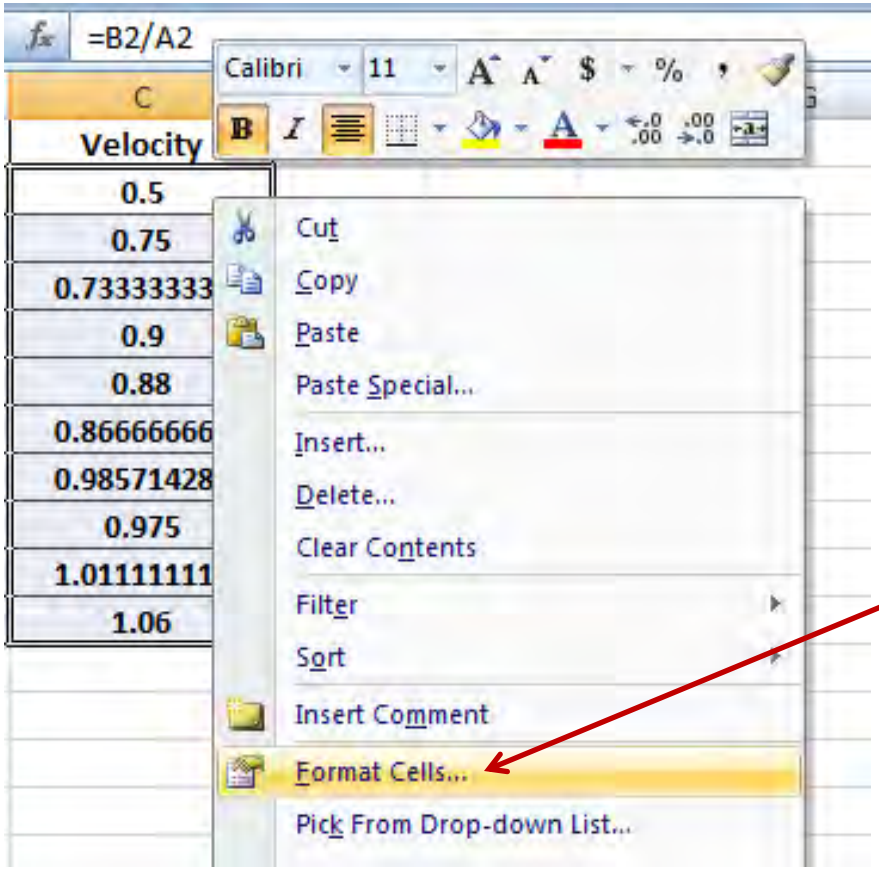
To view formulas simply go to the formulas tab and click “show formulas” under formula auditing.

Another tip of the trade

Time(s)	Distance(m)	Velocity
10.0	5.0	0.5
20.0	15.0	0.75
30.0	22.0	0.733333333
40.0	36.0	0.9
50.0	44.0	0.88
60.0	52.0	0.866666667
70.0	69.0	0.985714286
80.0	78.0	0.975
90.0	91.0	1.011111111
100.0	106.0	1.06

Suppose the data you enter has ONE decimal place and the calculated values do not. Is there a way to change the FORMAT of the calculated values?

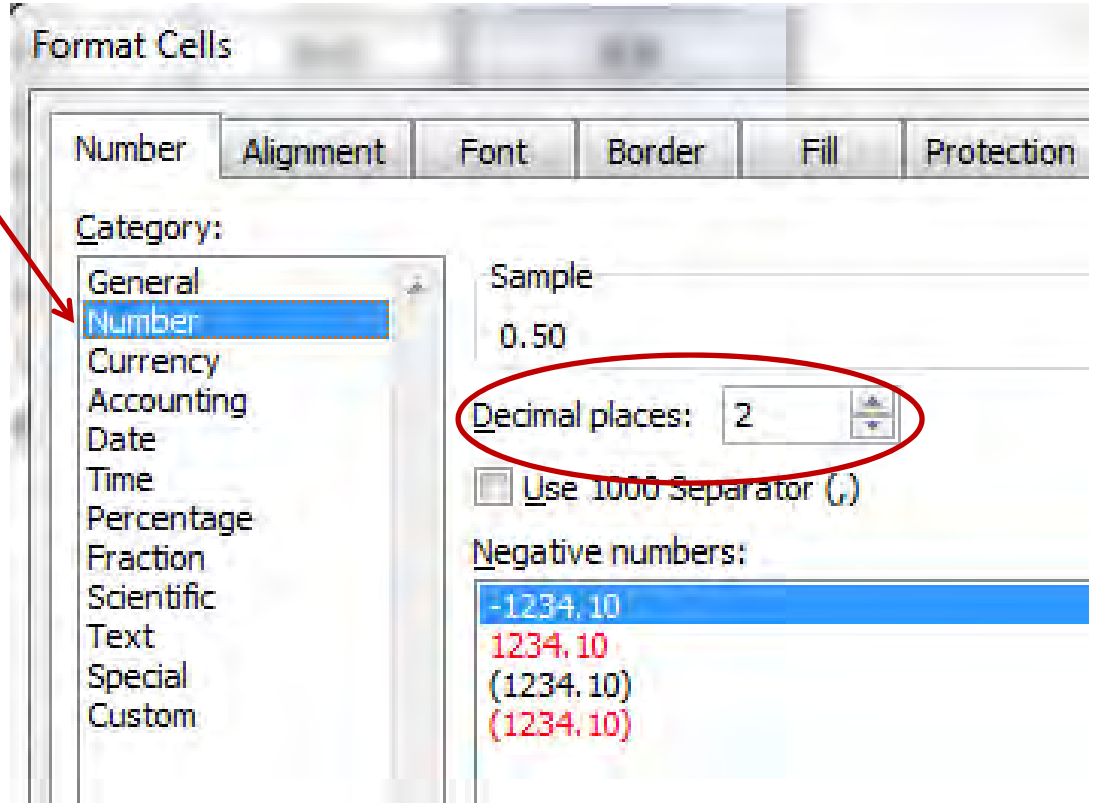
Another tip of the trade



Highlight the data you want to format and RIGHT CLICK with the mouse. Choose FORMAT CELLS from the menu.

Another tip of the trade

Choose NUMBER, then change the number of decimal places to match your entered data. In this case, ONE.



Another tip of the trade

A	B	C
Time(s)	Distance(m)	Velocity
10.0	5.0	0.5
20.0	15.0	0.8
30.0	22.0	0.7
40.0	36.0	0.9
50.0	44.0	0.9
60.0	52.0	0.9
70.0	69.0	1.0
80.0	78.0	1.0
90.0	91.0	1.0
100.0	106.0	1.1

Other function examples

- =SQRT(x) Takes square root of “x”
- =Min(x1:x20) Returns the minimum # in the set
- =Max(x1:x20) Returns the maximum # in the set
- =Round (x,n) Rounds “x” to n decimal places
- =Average (x1:x15) Returns the average

Example: =sum(A1, SQRT(A2/2),2*B3+5,D7:D12)

This example has FOUR arguments as evidenced by the commas

Example #2 – Student Exam Scores

Create the following worksheet: See paper worksheet

Student	Exam 1	Exam 2	Final Exam	Overall Score
Davis	82	77	94	
Graham	66	80	75	
Jones	95	100	97	
Meyers	47	62	78	
Richards	80	58	73	
Thomas	74	81	85	
Williams	57	62	67	

And ANOTHER tip of the trade – ABSOLUTE addressing

A	B	C	D
Weight (N)	Force(N)	Length1 =	0.25
5	=(A2*D1)/D2	Length2=	0.13
5.3			
5.9			
6.2			
6.8			
7.4			
8.5			

Suppose we have a situation like this. The force is found by multiplying the weight by length 1 then dividing that total by length 2. What would happen if we dragged the formula cell down?

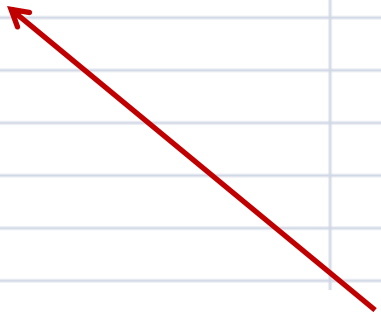
And ANOTHER tip of the trade – ABSOLUTE addressing

A	B	C	D
Weight (N)	Force(N)	Length1 =	0.25
5	=(A2*D1)/D2	Length2=	0.13
5.3	=(A3*D2)/D3		
5.9	=(A4*D3)/D4		
6.2	=(A5*D4)/D5		
6.8	=(A6*D5)/D6		
7.4	=(A7*D6)/D7		
8.5	=(A8*D7)/D8		

Notice that the formula is now incorrect in cells B3 – B8

And ANOTHER tip of the trade – ABSOLUTE addressing

A	B	C	D
Weight (N)	Force(N)	Length1 =	0.25
5	=(A2*$D$1)/$D$2	Length2=	0.13
5.3	=(A3*$D$1)/$D$2		
5.9	=(A4*$D$1)/$D$2		
6.2	=(A5*$D$1)/$D$2		
6.8	=(A6*$D$1)/$D$2		
7.4	=(A7*$D$1)/$D$2		
8.5	=(A8*$D$1)/$D$2		



To fix this problem we use the “$” sign in front of both the ROW and COLUMN. This creates an absolute address which is fixed in nature.

MATH AND TRIGONOMETRIC FUNCTION

Math	Excel Syntax	Purpose: Returns the: (Assume value of x is in cell A15.)
π	PI()	value of π (3.141593…)
e^x	EXP(A15)	Value of e^x where e is the base of Natural Log
$\sqrt{}$ x	SQRT(A15)	Value of the square root of x
$\log_{10}$ (x)	LOG10(A15)	Logarithm of x, with base 10
ln(x)	LN(A15)	Natural logarithm of x, with base e
SUM(x1,x2,x3)	SUM(A15:A17)	x1+x2+x3
cos(x)	COS(A15)	Cosine of x
sin(x)	SIN(A15)	Sine of x
tan(x)	TAN(A15)	Tangent of x
Average(x1,x2,x3)	AVERAGE(A15:A17)	(x1+x2+x3)/3

1.1. OUTLINE

1.1. OUTLINE
1.2. INTRODUCTION
1.3. DATA ENETRY
1.4. COLUMNS/ROWS/CELL
1.5. CELL SELECTION
1.6. ADVANCED FORMATTING

2.1. OUTLINE

2.1. EXCEL FORMULAS
2.2. FUNCTION
2.3. OTHER FUNCTIONS
2.4. FUNCTION EDITOR
2.5. CELLS REFERCENCES
2.6. TEXT / STRING / CHARACTER
2.7. CONCATENATION
2.8. LOWER & UPPER FUNCTION
2.9. LEN FUNCTION
2.10. TRUE AND FALSE
2.11. LOGICAL FUNCTION

3.1. OUTLINE

3.1. OUTLINE
3.2. INTRODUCTION
3.3. CORRELATION COEFFICIENT
3.4. CREATE A CHART USING THE CHART WIZARD
3.5. SCATTERPLOTS AND CORRELATIONS
3.6. VERTICAL LOOKUP FUNCTION
3.7. SLOPE AND INTERCEPT
3.8. FORECAST FUNCTION
3.9. DROP DOWN LIST
3.10. EXAMPLE OF N-VALUE CURVE AGAINST DEPTH
3.11. EXAMPLE OF BORING LOG