CGN 2420
INTRODUCTION TO EXCEL

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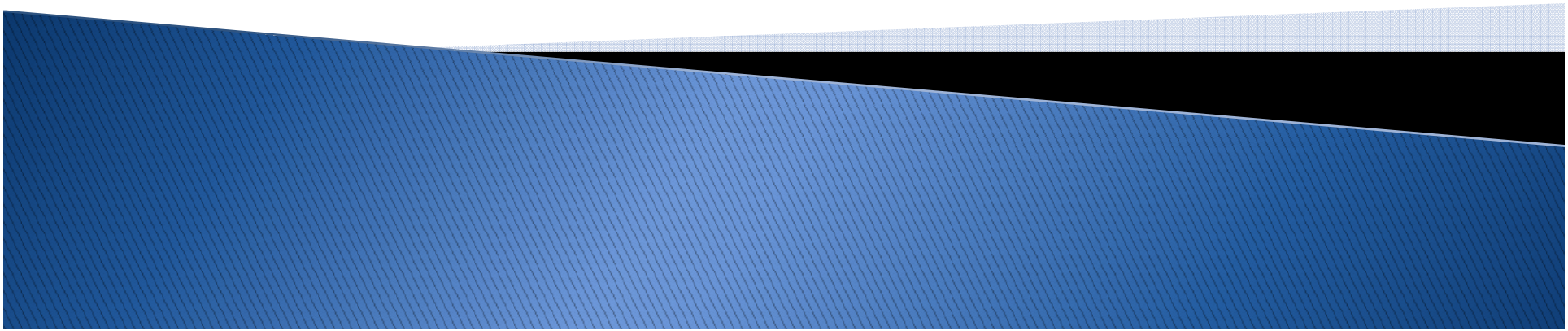
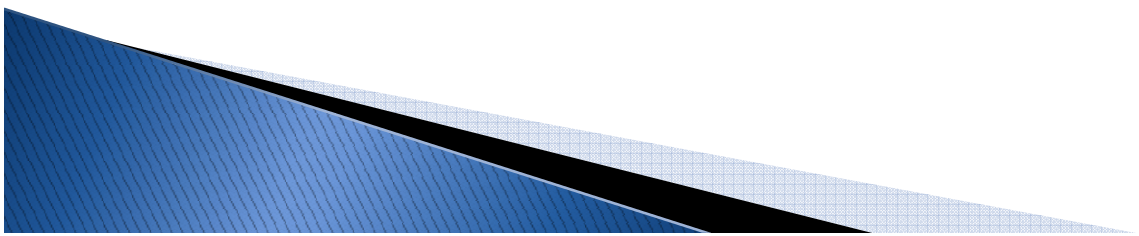


Objectives

- Understand the use of spreadsheets and Excel.
- Learn how to start using Excel.
- Laid out of the Excel screen.
- Fundamentals of using Excel.
- Insert text, formulas and functions.
- Work with editing tools.
- Preview and print a workbook.

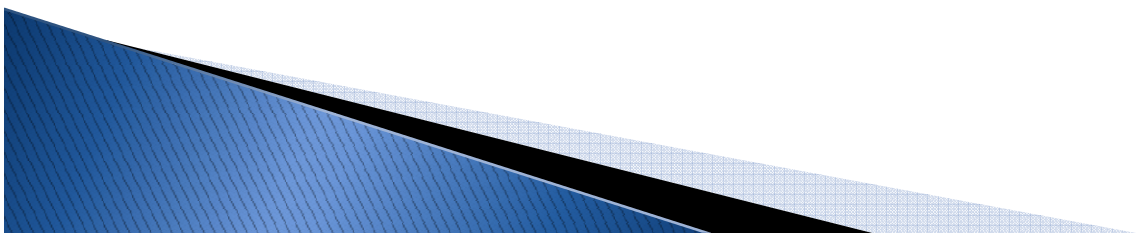
Spreadsheet

- A spreadsheet is a computer application that simulates a paper worksheet.
  - Contains grid of cells.
  - Values of cell can be numeric or alphanumeric.
  - Formula can be used to define cells.
  - Change to one cell updates all cells.
- Excel can handle most of the day-to-day tasks encountered by most engineers.



Why use a Spreadsheet?

- Spreadsheets are great for:
  - Performing the same calculation repeatedly.
  - Working with tabular information.
  - Producing graphs.
  - Performing “what if” studies.
  - Presenting results in a readable form.

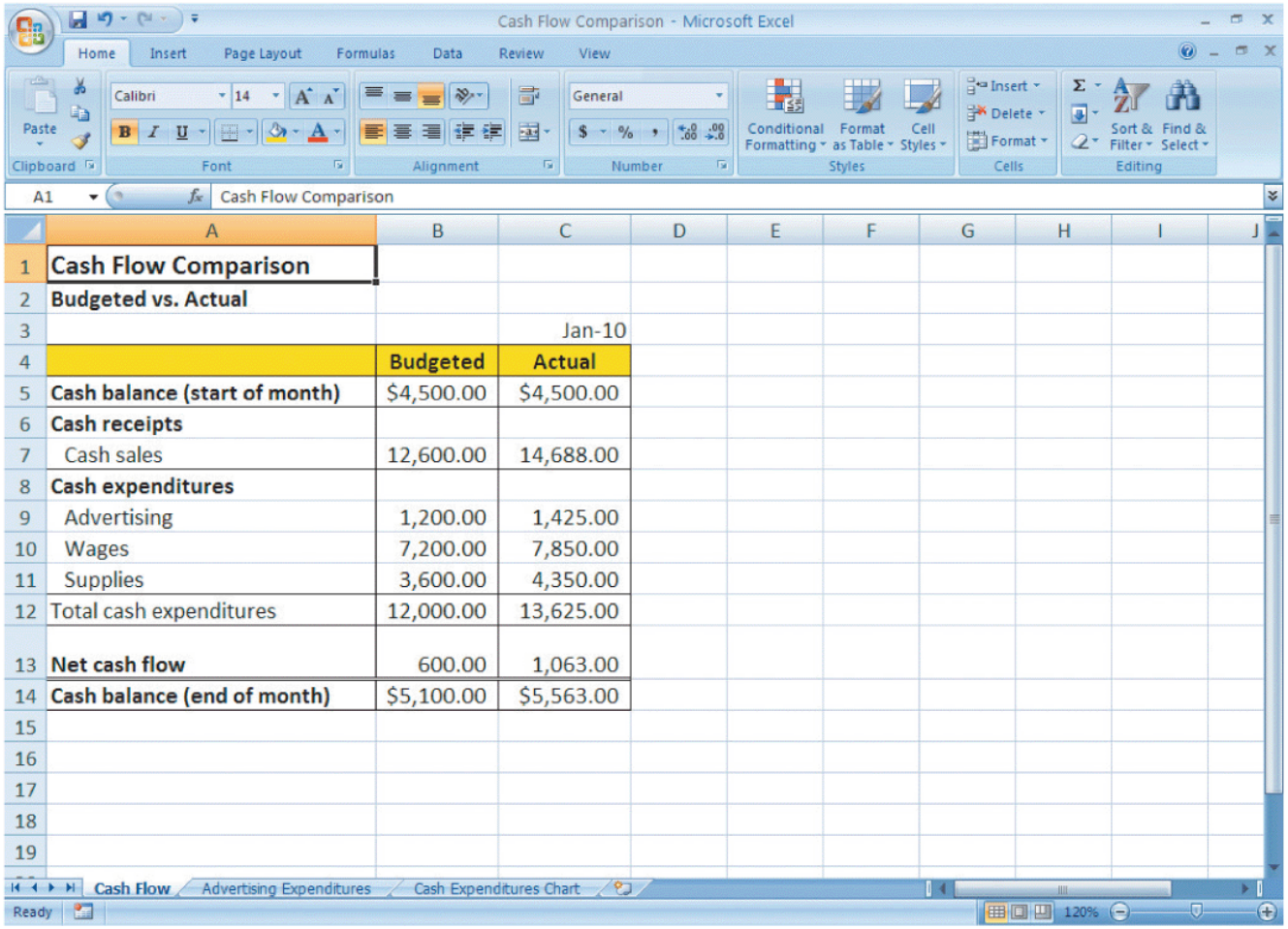


Introducing Excel

- **Microsoft Office Excel 2007** (or **Excel**) is a computer program used to enter, analyze, and present quantitative data.

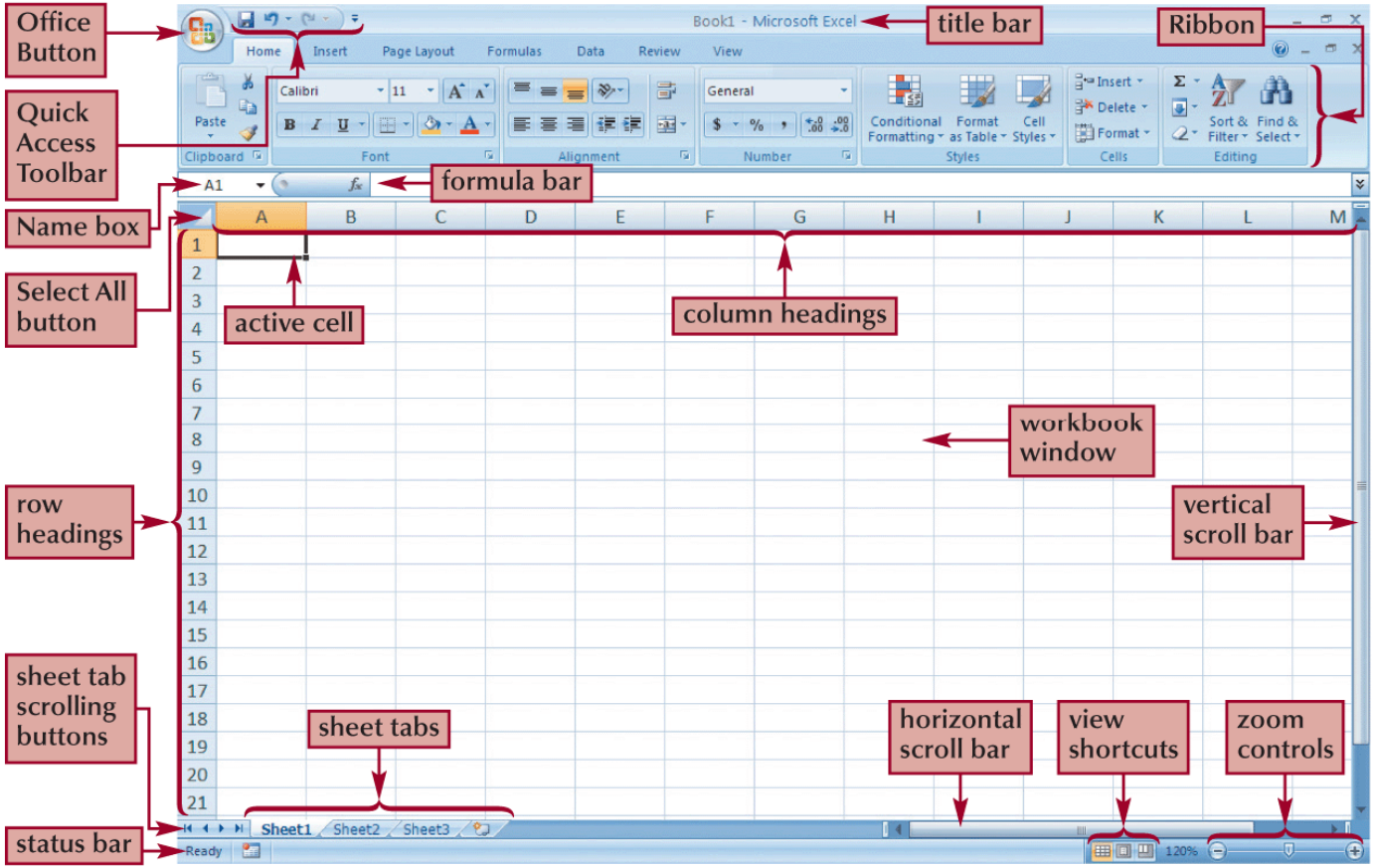
- Features include calculation, built-in functions, graphing tools, pivot tables and a macro programming language called VBA (Visual Basic for Applications).

Introducing Excel (Cont.)



	A	B	C
1	**Cash Flow Comparison**		
2	**Budgeted vs. Actual**		
3			Jan-10
4		**Budgeted**	**Actual**
5	**Cash balance (start of month)**	$4,500.00	$4,500.00
6	**Cash receipts**		
7	Cash sales	12,600.00	14,688.00
8	**Cash expenditures**		
9	Advertising	1,200.00	1,425.00
10	Wages	7,200.00	7,850.00
11	Supplies	3,600.00	4,350.00
12	Total cash expenditures	12,000.00	13,625.00
13	**Net cash flow**	600.00	1,063.00
14	**Cash balance (end of month)**	$5,100.00	$5,563.00

Exploring Excel



Exploring Excel (Cont.)

Feature	Description
Office Button	A button that provides access to workbook-level features and program settings
Quick Access Toolbar	A collection of buttons that provide one-click access to commonly used commands, such as Save, Undo, and Repeat
Title bar	A bar that displays the name of the active workbook and the Excel program name
Ribbon	The main set of commands organized by task into tabs and groups
Column headings	The letters that appear along the top of the worksheet window to identify the different columns in the worksheet
Workbook window	A window that displays an Excel workbook
Vertical scroll bar	A scroll bar used to scroll vertically through the workbook window
Horizontal scroll bar	A scroll bar used to scroll horizontally through the workbook window
Zoom controls	Controls for magnifying and shrinking the content displayed in the active workbook window
View shortcuts	Buttons used to change how the worksheet content is displayed—Normal, Page Layout, or Page Break Preview view
Sheet tabs	Tabs that display the names of the worksheets in the workbook
Sheet tab scrolling buttons	Buttons to scroll the list of sheet tabs in the workbook
Row headings	The numbers that appear along the left of the worksheet window to identify the different rows in the worksheet
Select All button	A button used to select all of the cells in the active worksheet
Active cell	The cell currently selected in the active worksheet
Name box	A box that displays the cell reference of the active cell
Formula bar	A bar that displays the value or formula entered in the active cell

Navigating a Worksheet

- Excel provides several ways to navigate a worksheet.

Press	To move the active cell
↑, ↓, ←, →	Up, down, left, or right one cell
Home	To column A of the current row
Ctrl+Home	To cell A1
Ctrl+End	To the last cell in the worksheet that contains data
Enter	Down one row or to the start of the next row of data
Shift+Enter	Up one row
Tab	One column to the right
Shift+Tab	One column to the left
Page Up, Page Down	Up or down one screen
Ctrl+Page Up, Ctrl+Page Down	To the previous or next sheet in the workbook

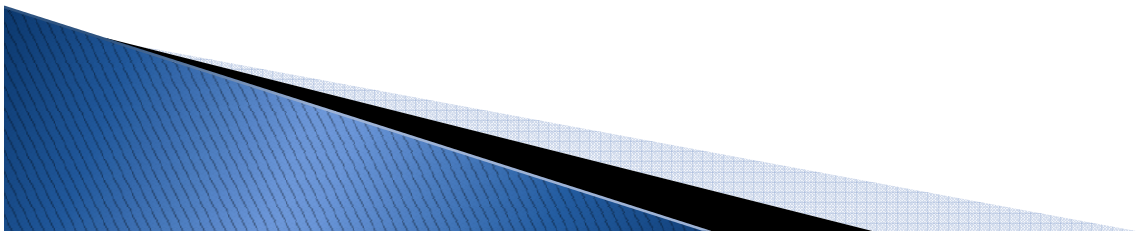
Active Cell

- Each rectangle of the grid is called a cell.
- Each cell is identified by its “cell address”, made up of a column letter and a row number.
- The active cell is indicated in several ways:
  - It is surrounded by a heavy border.
  - The row and column of the active cell are highlighted.
  - Its cell address is shown in the name box.

Entering Data in Cells

- A Cell can contain one of these:
  - A label – one o more text characters or words
  - A value – a number
  - A Formula or function – an equation

  The **formula bar** displays the content of the active cell.



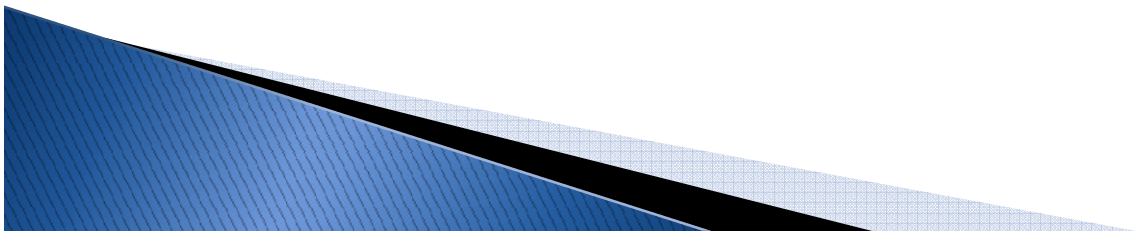
Entering Data in Cells

Excel attempts to classify the cells contents as you type:

- If you enter a number, Excel treats the cell content as a value, and the numeric value appear in the cell.
- If the first character typed is an equal sign (=), Excel will interpret the cell's content as a formula.
- If the first character is not a number or an equal sign (=), Excel will treat the cell content as text.

Formulas in Excel

- A **formula** is an expression that returns a value.
- A formula is written using **operators** that combine different values, returning a single value that is then displayed in the cell. The most commonly used operators are **arithmetic operators.**
- The **order of precedence** is a set of predefined rules used to determine the sequence in which operators are applied in a calculation.



Arithmetic Operators

Operation	Arithmetic Operator	Example	Description
Addition	+	=10+A1 =B1+B2+B3	Adds 10 to the value in cell A1 Adds the values in cells B1, B2, and B3
Subtraction	–	=C9–B2 =1–D2	Subtracts the value in cell B2 from the value in cell C9 Subtracts the value in cell D2 from 1
Multiplication	*	=C9*B9 =E5*0.06	Multiplies the values in cells C9 and B9 Multiplies the value in cell E5 by 0.06
Division	/	=C9/B9 =D15/12	Divides the value in cell C9 by the value in cell B9 Divides the value in cell D15 by 12
Exponentiation	^	=B5^3 =3^B5	Raises the value of cell B5 to the third power Raises 3 to the value in cell B5

Order of precedence rules

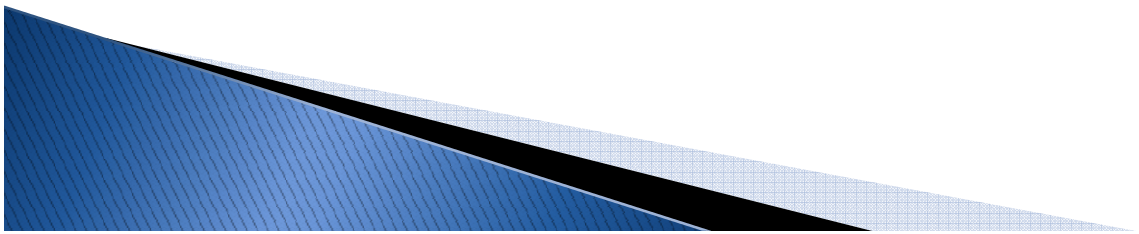
Formula (A1=50, B1=10, C1=5)	Order of Precedence Rule	Result
=A1+B1*C1	Multiplication before addition	100
=(A1+B1)*C1	Expression inside parentheses executed before expression outside	300
=A1/B1-C1	Division before subtraction	0
=A1/(B1-C1)	Expression inside parentheses executed before expression outside	10
=A1/B1*C1	Two operators at same precedence level, leftmost operator evaluated first	25
=A1/(B1*C1)	Expression inside parentheses executed before expression outside	1

Entering a Formula

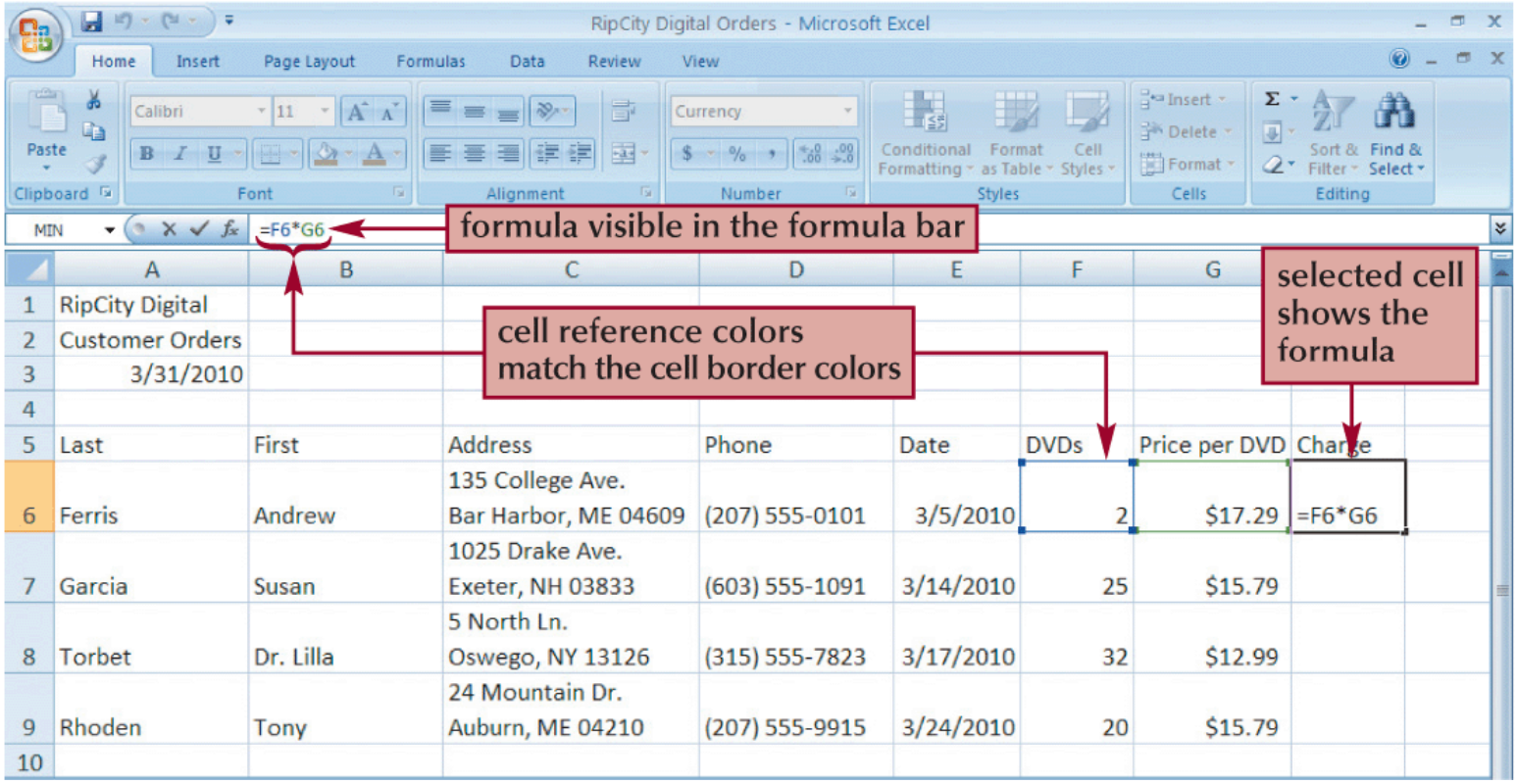
- Click the cell in which you want the formula results to appear.
- Type = and an expression that calculates a value using cell references and arithmetic operators.
- Press the Enter key or press the Tab key to complete the formula.

Order of Precedence in Excel

- "Please Excuse My Dear Aunt Sally" is an old mnemonic device used to remember the order in which the parts of a formula are calculated.
- Please = P = Parentheses
- Excuse = E = Exponents (^ power of 2, etc.)
- My = M= Multiplication
- Dear = D = Division
- Aunt = A = Addition
- Sally = S = Subtraction



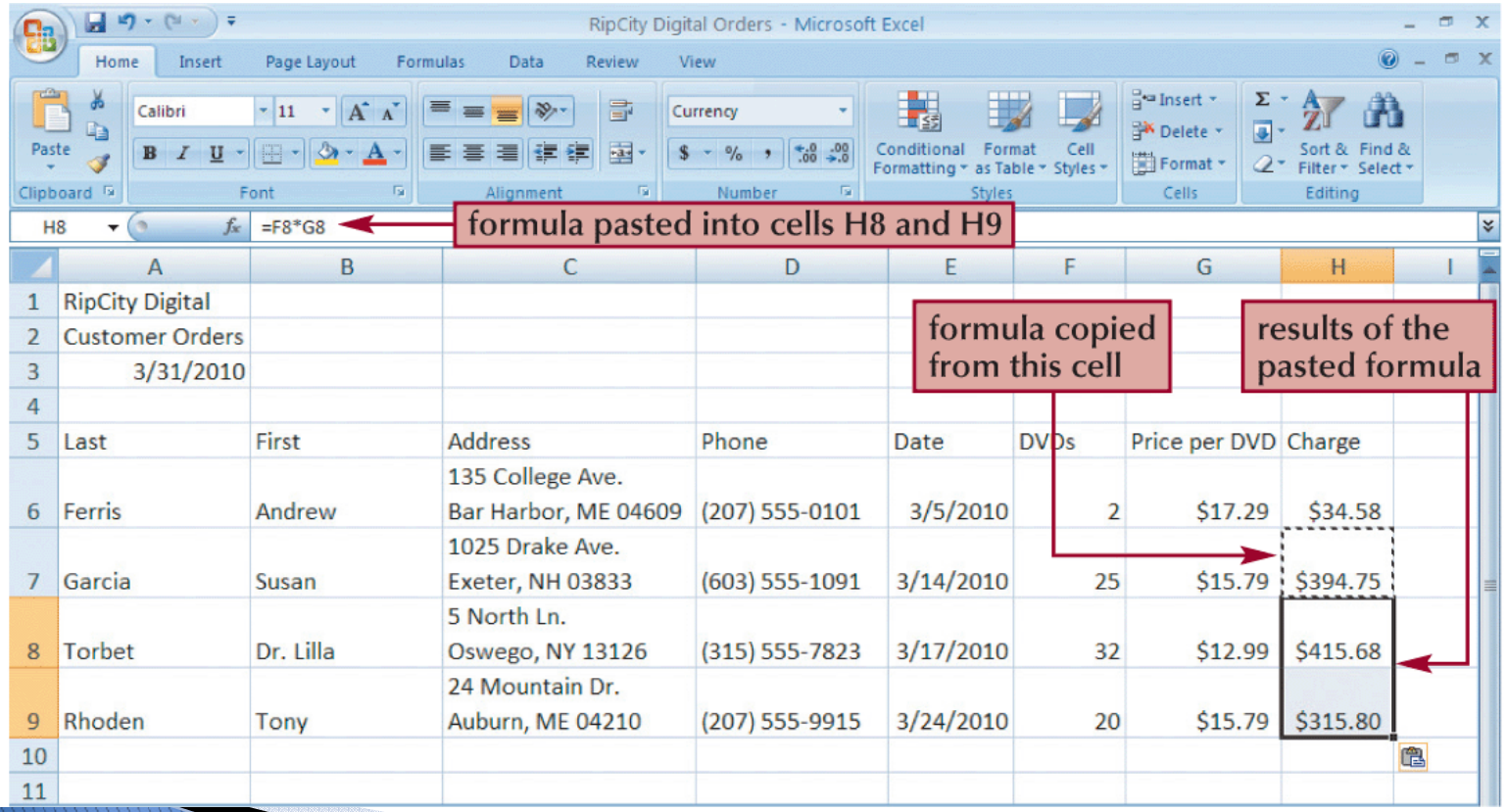
Cell reference colors



	A	B	C	D	E	F	G	
1	RipCity Digital							
2	Customer Orders							
3	3/31/2010							
4								
5	Last	First	Address	Phone	Date	DVDs	Price per DVD	Charge
6	Ferris	Andrew	135 College Ave. Bar Harbor, ME 04609	(207) 555-0101	3/5/2010	2	$17.29	=F6*G6
7	Garcia	Susan	1025 Drake Ave. Exeter, NH 03833	(603) 555-1091	3/14/2010	25	$15.79	
8	Torbet	Dr. Lilla	5 North Ln. Oswego, NY 13126	(315) 555-7823	3/17/2010	32	$12.99	
9	Rhoden	Tony	24 Mountain Dr. Auburn, ME 04210	(207) 555-9915	3/24/2010	20	$15.79	
10								

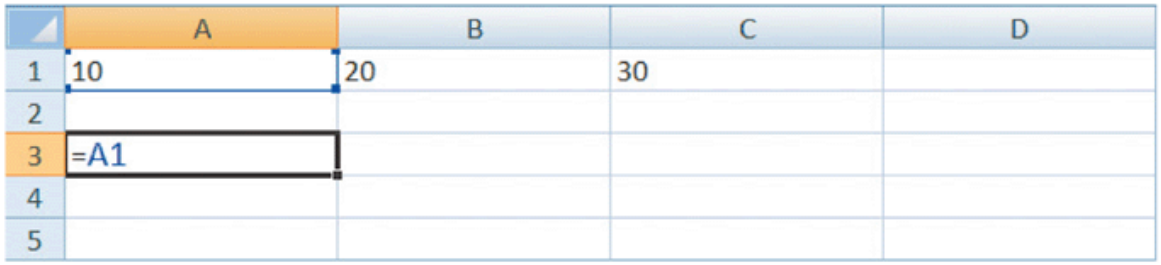
Copying and Pasting formulas

- Excel adjusts the formula's cell references to reflect the new location of the formula in the worksheet.



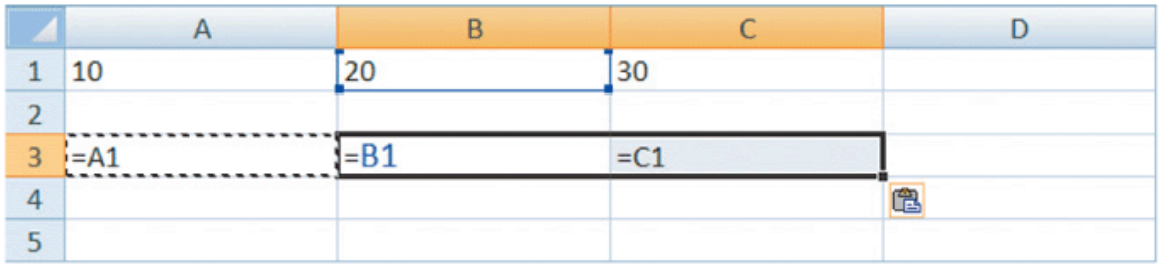
Using Relative References

original formula with a relative reference



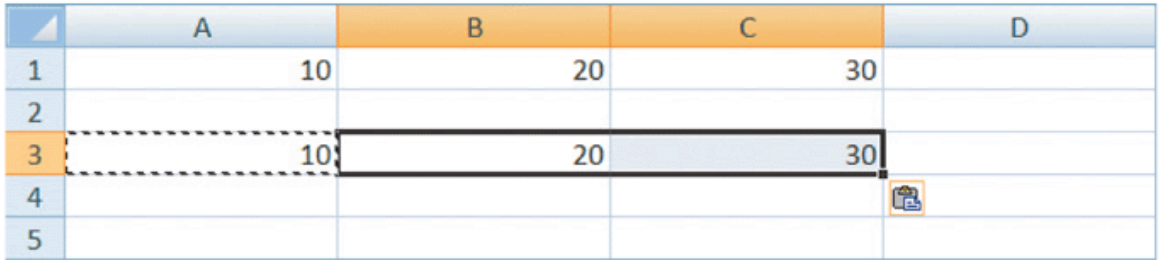
	A	B	C	D
1	10	20	30	
2				
3	=A1			
4				
5				

formula copied to a new range (column and row references shift based on cell location)



	A	B	C	D
1	10	20	30	
2				
3	=A1	=B1	=C1	
4				
5				

formula results



	A	B	C	D
1	10	20	30	
2				
3	10	20	30	
4				
5				

Using Absoluted References

original formula with an absolute reference

	A	B	C	D
1	10	20	30	
2				
3	=$A$1			
4				
5				

formula copied into a new range (column and row references fixed regardless of cell location)

	A	B	C	D
1	10	20	30	
2				
3	=$A$1	=$A$1	=$A$1	
4				
5				

formula results

	A	B	C	D
1	10	20	30	
2				
3	10	10	10	
4				
5				

Using Mixed References

original formula with a mixed reference

	A	B	C	D
1	10	20	30	
2				
3	=A$1			
4				
5				

formula copied to a new range (row reference fixed on row 1, column reference shifts based on the cell location)

	A	B	C	D
1	10	20	30	
2				
3	=A$1	=B$1	=C$1	
4	=A$1	=B$1	=C$1	
5	=A$1	=B$1	=C$1	

formula results

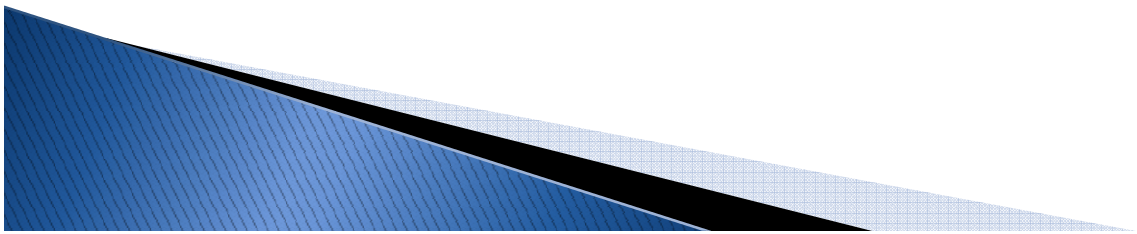
	A	B	C	D
1	10	20	30	
2				
3	10	20	30	
4	10	20	30	
5	10	20	30	

Entering Functions

- A function is a named operation that returns a value.
- Functions are used to perform the same calculation multiple times using different input values.
- Excel classifies its built-in functions into different categories.

Categories of Excel Functions

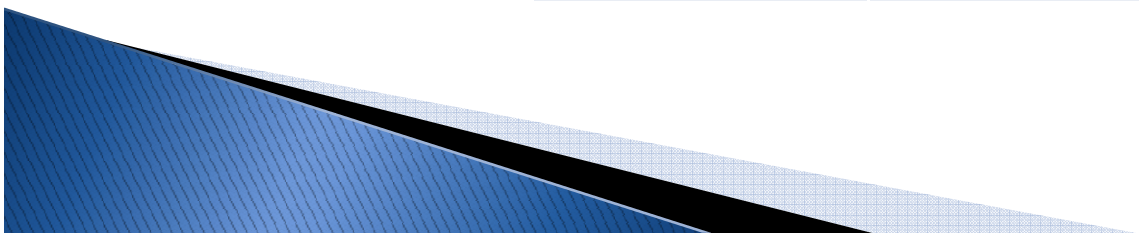
Category	Contains functions that
Database	Retrieve and analyze data stored in databases
Date & Time	Analyze or create date and time values and time intervals
Engineering	Analyze engineering problems
Financial	Have financial applications
Information	Return information about the format, location, or contents of worksheet cells
Logical	Return logical (true-false) values
Lookup & Reference	Look up and return data matching a set of specified conditions from a range
Math & Trig	Have math and trigonometry applications
Statistical	Provide statistical analyses of a set of data
Text	Return text values or evaluate text



Simple Math Functions

Most common math operations beyond multiplication and division are implemented as functions in Excel.

Operation	Function Name
Square Root	SQRT(x)
Absolute value	ABS(x)
Factorial	FACT (x)
Summation	SUM(range)

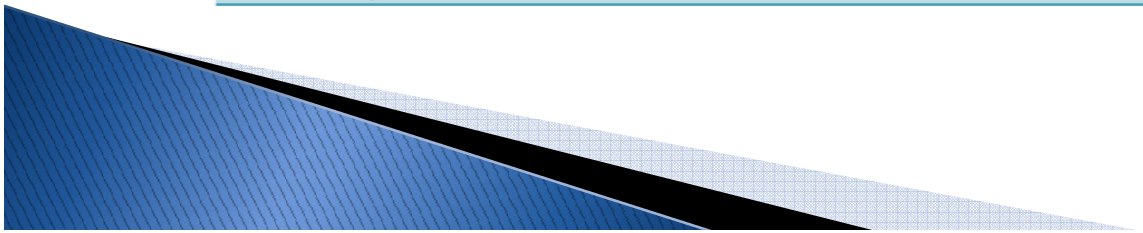


Understanding Function Syntax

- Every function has to follow a set of rules, or **syntax**, which specifies how the function should be written.
- Built-in functions are identified by a name and usually require and argument list.
- The insert function button opens the Insert function dialog. The Insert function dialog provides access to all of Excel's built-in functions.

Examples of Excel Functions

Function	Category	Description
AVERAGE(*number1* [, *number2*, *number3*, ...])	Statistical	Calculates the average of a collection of numbers, where *number1*, *number2*, and so forth are either numbers or cell references. Only *number1* is required. For more than one cell reference or to enter numbers directly into the function, use the optional arguments *number2*, *number3*, and so forth.
COUNT(*value1* [, *value2*, *value3*, ...])	Statistical	Counts how many cells in a range contain numbers, where *value1*, *value2*, and so forth are text, numbers, or cell references. Only *value1* is required. For more than one cell reference or to enter numbers directly into the function, use the optional arguments *value2*, *value3*, and so forth.
COUNTA(*value1*, [,*value2*, *value3*, ...]	Statistical	Counts how many cells are not empty in ranges *value1*, *value2*, and so forth, or how many numbers are listed within *value1*, *value2*, and so forth.
INT(*number*)	Math & Trig	Displays the integer portion of a number, *number*.
MAX(*number1* [, *number2*, *number3*, ...])	Statistical	Calculates the maximum value of a collection of numbers, where *number1*, *number2*, and so forth are either numbers or cell references.
MEDIAN(*number1* [, *number2*, *number3*, ...])	Statistical	Calculates the median, or middle, value of a collection of numbers, where *number1*, *number2*, and so forth are either numbers or cell references.
MIN(*number1* [, *number2*, *number3*, ...])	Statistical	Calculates the minimum value of a collection of numbers, where *number1*, *number2*, and so forth are either numbers or cell references.
RAND()	Math & Trig	Returns a random number between 0 and 1.
ROUND(*number*, *num_digits*)	Math & Trig	Rounds a number to a specified number of digits, where *number* is the number you want to round and *num_digits* specifies how many digits to which you want to round the number.
SUM(*number1* [, *number2*, *number3*, ...])	Math & Trig	Adds a collection of numbers, where *number1*, *number2*, and so forth are either numbers or cell references.



Error Messages in Excel

Message	Meaning
#DIV/O	Attempted to divide by zero
#N/A	Not available. There is a NA() function in Excel that returns #N/A. Some Excel functions return #N/A for certain errors. Attempts to do math with #N/A values also return #N/A
#NAME?	Not recognized. Excel could not recognized the name of the function, cell or cell range you tried to use.
#NUM!	Not a valid number. A function or math operation returned an invalid numeric value.
#REF!	An invalid cell reference was encountered.
#VALUE!	Type error.