



UNIT

**B**

Excel 2010

# Microsoft Excel 2010- Illustrated

## Unit B: Working with Formulas and Functions

# Objectives

- Create a complex formula
- Insert a function
- Type a function
- Copy and move cell entries
- Understand relative and absolute cell references

# Objectives

- Copy formulas with relative cell references
- Copy formulas with absolute cell references
- Round a value with a function

# Creating a Complex Formula

- A **complex formula** is an equation that uses more than one type of arithmetic operator
  - Example: formula that uses both addition and multiplication
  - Arithmetic operations are performed according to the order of precedence

# Creating a Complex Formula

Formula containing multiple arithmetic operators

	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
Australia	5367.4	5860.49	6583.12	6133.14	
Britain	3510.99	3921.46	4337.4	4558.11	
Canada	4287.76	4371.98	4570.21	4100.06	
France	4032.1	4489.74	4579.06	4653.92	
Germany	5082.77	2994.56	3561.12	3712.5	
India	1468.25	2510.3	2665.04	2890.95	
Japan	3271.5	3556.14	8240.35	3721.69	
U.S.A.	7195.06	6542.76	8240.36	7018.91	
Total	34215.83	34247.43	42776.66	36789.28	
20% rise	=B12+B12*.2				
Average					
Maximum					
Minimum					

Complex formula

Mode indicator

# Creating a Complex Formula

- Order of precedence in Excel formulas
  - Operations inside parentheses are calculated first
  - Exponents are calculated next
  - Multiplication and division are calculated next (from left to right)
  - Addition and subtraction are calculated next (from left to right)

# Inserting a Function

- A **function** is a predefined worksheet formula that makes it easy to perform a complex calculation
  - Can be used by itself or within a formula
  - If used alone, begins with the formula prefix (=)

# Inserting a Function

## Expanded Function Arguments dialog box

**Function**

**Insert Function button**

**Argument**

**Description and argument format**

EX B-Tour Expense Analysis.xlsx - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View

Calibri 11 A A General

Paste B I U \$ % , .00 .00 Conditional Formatting as Table Styles Cell Styles Delete Sort & Find & Filter Select Editing

Clipboard Font Alignment Number Cells

AVERAGE X ✓ =AVERAGE(B4:B11)

	Quarter 1	Quarter 2
4 Australia	5367.4	5860.49
5 Britain	3510.99	3921.46
6 Canada	4287.76	4371.98
7 France	4032.1	4489.74
8 Germany	5082.77	2994.56
9 India	1468.25	2510.3
10 Japan	3271.5	3555.14
11 U.S.A.	7195.06	6542.76
12 Total	34215.63	34247.43
14 20% rise	41058.996	41096.916
15 Average	=(B4:B11)	
16 Maximum		
17 Minimum		
18		
19		

Function Arguments

AVERAGE

Number1: B4:B11 = {5367.4;3510.99;4287.76;4032.1;5...

Number2: = number

= 4276.97875

Returns the average (arithmetic mean) of its arguments, which can be numbers or names, arrays, or references that contain numbers.

Number1: number1,number2,... are 1 to 255 numeric arguments for which you want the average.

Formula result = 4276.97875

Help on this function

OK Cancel



# Typing a Function

- A function can be typed manually into a cell
  - You must know the name and initial characters of the function
  - Can be faster than using the Insert Function dialog box
  - Experienced Excel users often prefer this method

# Typing a Function

- While manually typing a function, it is necessary to begin with the equal sign (=)
- Once you type an equal sign, each letter you type activates the AutoComplete feature

# Typing a Function

MAX function in progress

13						
14	20% rise	41058.996	41096.916	51331.992	44147.136	
15	Average	4276.97875	4280.92875	5347.0825	4598.66	
16	Maximum	=MAX(				
17	Minimum	MAX(number1, [number2], ...)				
18						

# Copying and Moving Cell Entries

- You can copy or move data within a worksheet or between worksheets using:
  - Cut, Copy, and Paste buttons
  - Fill handle in the lower-right corner of the active cell
  - Drag-and-drop feature
- **Office Clipboard** temporarily stores information that you copy or cut

# Copying and Moving Cell Entries

- Pasting an item from the Clipboard
  - Only need to specify the upper-left cell of the range where you want to paste the selection

# Copying and Moving Cell Entries

Clipboard data in Office Clipboard

Paste button

Copy button

Clipboard launcher

Item in Clipboard

	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
1	Tour Expenses by Quarter, FY 2013				
2					
3	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
4	Australia	5367.4	5860.49	6583.12	6133.14
5	Britain	3510.99	3921.46	4337.4	4558.11
6	Canada	4287.76	4371.98	4570.21	4100.06
7	France	4032.1	4489.74	4579.06	4653.92
8	Germany	5082.77	2994.56	3561.12	3712.5
9	India	1468.25	2510.3	2665.04	2890.95
10	Japan	3271.5	3556.14	8240.35	3721.69
11	U.S.A.	7195.06	6542.76	8240.36	7018.91
12	Total	34215.83	34247.43	42776.66	36789.28
13					
14	20% rise	41058.996	41096.916	51331.992	44147.136
15	Average	4276.97875	4280.92875	5347.0825	4598.66
16	Maximum	7195.06	6542.76	8240.36	7018.91
17	Minimum	1468.25	2510.3	2665.04	2890.95
18					
19	Quarter 1	Quarter 2	Quarter 3	Quarter 4	
20					
21					

# Understanding Relative and Absolute Cell References

- Use a **relative cell reference** when you want to preserve the relationship to the formula location
  - Calculations are performed based on cell relationship
  - When a formula is copied, the cell reference changes to preserve the relationship of the formula to the referenced cells
  - The Excel default

# Understanding Relative and Absolute Cell References

Formulas containing relative references

Formula containing relative references

	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
Australia	5,400	5,800	5,900	6,100	\$ 23,200
Britain	3,700	4,700	4,500	4,600	\$ 17,500
Canada	4,500	4,400	4,600	4,600	\$ 18,100
France	4,200	4,500	4,600	4,700	\$ 18,000
Germany	3,100	3,000	3,600	3,800	\$ 13,500
India	1,600	2,500	2,600	2,900	\$ 9,600
Japan	3,300	3,600	3,600	3,800	\$ 14,300
U.S.A.	7,200	6,600	8,300	7,100	\$ 29,200
<b>Total</b>	<b>\$ 33,000</b>	<b>\$ 35,100</b>	<b>\$ 37,700</b>	<b>\$ 37,600</b>	<b>\$ 105,800</b>

  

	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
Australia	8,100	8,700	8,850	9,150	\$ 34,800
Britain	5,550	7,050	6,750	6,900	\$ 26,250
Canada	6,750	6,600	6,900	6,900	\$ 27,150
France	6,300	6,750	6,900	7,050	\$ 27,000
Germany	4,650	4,500	5,400	5,700	\$ 20,250
India	2,400	3,750	3,900	4,350	\$ 14,400
Japan	4,950	5,400	5,400	5,700	\$ 21,450
U.S.A.	10,800	9,900	12,450	10,650	\$ 43,800
<b>Total</b>	<b>\$ 49,500</b>	<b>\$ 52,650</b>	<b>\$ 56,550</b>	<b>\$ 56,400</b>	<b>\$ 215,100</b>



# Understanding Relative and Absolute Cell References

- Use an **absolute cell reference** when you want to preserve the exact cell address in a formula
  - Reference does not change even if the formula is copied to another location
  - Created by placing a dollar sign (\$) before both the column letter and the row number for the cell's address



# Understanding Relative and Absolute Cell References

- Using a **mixed reference**
  - A mixed cell reference combines both relative and absolute cell referencing
    - Example: When you copy a formula, you may want to change the row reference but keep the column reference
  - Created using the [F4] function key

# Copying Formulas with Relative Cell References

- Reuse formulas you have created
- Use Copy and Paste commands or the fill handle to copy formulas
- Copying a formula to a new cell
  - Excel substitutes new cell references so that the relationship of the cells to the formula remains unchanged

# Copying Formulas with Relative Cell References

Formula pasted in a range

Paste button

Paste button list arrow

Paste Options button

The screenshot shows the Excel interface with the 'Home' ribbon selected. The 'Paste' button in the Clipboard group is highlighted, and its dropdown menu is open, showing the 'Paste Options' button. The active cell is F5, containing the formula `=SUM(B5:E5)`. The spreadsheet data is as follows:

	A	B	C	D	E	F	G	H
1	Tour Expenses by Quarter, FY 2013							
2								
3		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total		
4	Australia	5367.4	5860.49	6583.12	6133.14	23944.15		
5	Britain	3510.99	3921.46	4337.4	4558.11	16327.96		
6	Canada	4287.76	4371.98	4570.21	4100.06	17330.01		
7	France	4032.1	4489.74	4579.06	4653.92			
8	Germany	5082.77	2994.56	3561.12	3712.5			
9	India	1468.25	2510.3	2665.04	2890.95			
10	Japan	3271.5	3556.14	8240.35	3721.69			
11	U.S.A.	7195.06	6542.76	8240.36	7018.91			
12	Total	34215.83	34247.43	42776.66	36789.28			
13								

# Copying Formulas with Relative Cell References

- Auto Fill feature can be used for filling cells with sequential text or values
  - Months of the year; days of the week; or text plus a number (Quarter 1, Quarter 2, etc.)
  - Drag the fill handle to extend an existing sequence

# Copying Formulas with Absolute Cell References

- Apply absolute cell reference before copying a formula if you want one or more cell references to remain unchanged in relation to the formula



# Copying Formulas with Absolute Cell References

Absolute reference created in formula

Absolute cell reference in formula

	A	B	C	D	E	F	G	H	I	
1	Tour Expenses by Quarter, FY 2013							Change		
2							1.1			
3		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total		What if?		
4	Australia	5367.4	5860.49	6583.12	6133.14	23944.15		=F4*\$G\$2		
5	Britain	3510.99	3921.46	4337.4	4558.11	16327.96		0		
6	Canada	4287.76	4371.98	4570.21	4100.06	17330.01		0		
7	France	4032.1	4489.74	4579.06	4653.92	17754.82		0		
8	Germany	5082.77	2994.56	3561.12	3712.5	15350.95		0		
9	India	1468.25	2510.3	2665.04	2890.95	9534.54		0		
10	Japan	3271.5	3556.14	8240.35	3721.69	18789.68		0		
11	U.S.A.	7195.06	6542.76	8240.36	7018.91	28997.09		0		
12	Total	34215.83	34247.43	42776.66	36789.28					
13										
14	20% rise	41058.996	41096.916	51331.992	44147.136					
15	Average	4276.97875	4280.92875	5347.0825	4598.66					
16	Maximum	7195.06	6542.76	8240.36	7018.91					
17	Minimum	1468.25	2510.3	2665.04	2890.95					
18										
19										
20		Quarter 1	Quarter 2	Quarter 3	Quarter 4					
21	30% rise	44480.579	44521.659	55609.658	47826.064					
22										

Incorrect values from relative referencing in copied formulas



# Rounding a Value with a Function

- Cells containing financial data are often easier to read if they contain fewer decimals
- Use the ROUND function to round down your results

# Rounding a Value with a Function

ROUND function added to an existing formula

	A	B	C	D	E	F	G	H	I	
1	Tour Expenses by Quarter, FY 2013						Change			
2							1.2			
3		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total		What if?		
4	Australia	5367.4	5860.49	6583.12	6133.14	23944.15		28732.98		
5	Britain	3510.99	3921.46	4337.4	4558.11	16327.96		19593.55		
6	Canada	4287.76	4371.98	4570.21	4100.06	17330.01		20796.01		
7	France	4032.1	4489.74	4579.06	4653.92	17754.82		21305.78		
8	Germany	5082.77	2994.56	3561.12	3712.5	15350.95		18421.14		
9	India	1468.25	2510.3	2665.04	2890.95	9534.54		11441.45		
10	Japan	3271.5	3556.14	8240.35	3721.69	18789.68		22547.62		
11	U.S.A.	7195.06	6542.76	8240.36	7018.91	28997.09		34796.51		
12	Total	34215.83	34247.43	42776.66	36789.28					
13										
14	20% rise	=ROUND(B1	41096.916	51331.992	44147.136					
15	Average	4276.97875	4280.92875	5347.0825	4598.66					
16	Maximum	7195.06	6542.76	8240.36	7018.91					
17	Minimum	1468.25	2510.3	2665.04	2890.95					
18										
19										
20		Quarter 1	Quarter 2	Quarter 3	Quarter 4					
21	30% rise	44480.579	44521.659	55609.658	47826.064					
22										

ROUND function and opening parenthesis inserted in formula

ScreenTip indicates what information is needed

# Summary

- Create a complex formula
- Insert a function
- Type a function
- Copy and move cell entries
- Understand relative and absolute cell references

# Summary

- Copy formulas with relative cell references
- Copy formulas with absolute cell references
- Round a value with a function