TechMentors

Helping you get the most out of technology

Excel Formulas and Functions

Student Manual

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Outline

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Outline

- Inserting Functions continued
  - Math Functions
  - Text Functions
  - Logical Functions
  - Information Functions
  - Date Functions
- Linking Cells
- Complex Formulas

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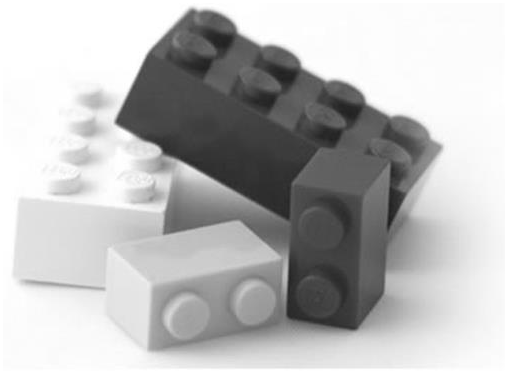
Formulas are like Legos



Put them together to create great things!

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Creating Simple Formulas

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How do I start a formula?

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Every cell formula should start with an equal sign

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Most formulas use operators

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What is an operator?

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Operators

	Operator
+	Add
-	Subtract
*	Multiply
/	Divide
^	Exponents
&	Concatenate

	Operator
=	Equal
<	Less than
>	Greater than
<=	Less than or equal to
>=	Greater than or equal to
<>	No equal to

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Reference Operators

	Operator	Example
:	Through	A1:D10
,	And	A1,D10
!	Separates sheet from cell address	Sheet2!D5
$	Absolute Reference	$A1

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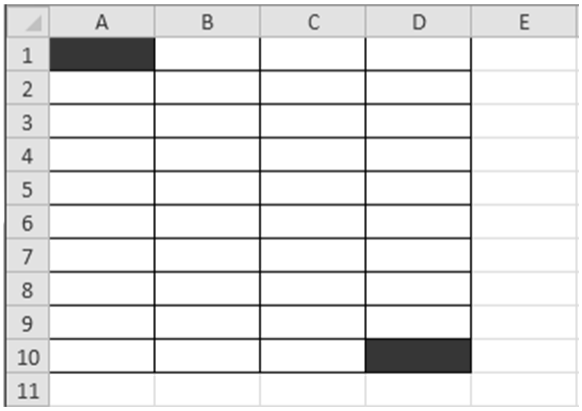
What address is shown?



A: A1:D10
B: A1,D10
C: D1:A10
D: D1,A10

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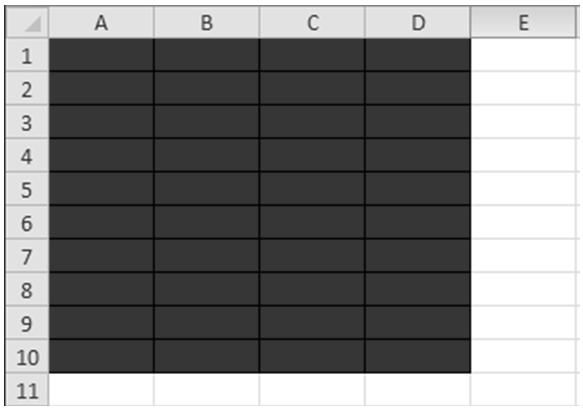
What address is shown?



A: A1:D10
B: A1,D10
C: D1:A10
D: D1,A10

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What can formulas reference?

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Literal Values

Data Type	Example
Numbers	3 -100 123,987.65
Text	Sales Expenses
Dates	12/25/2012 July 4, 1976
Logicals	True FALSE

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Cell References

Reference Type	Example
One cell	A1
Multiple cells	A1:B30
Other worksheets	Sheet2!D5
Other workbooks	[Book1]Sheet2!D5

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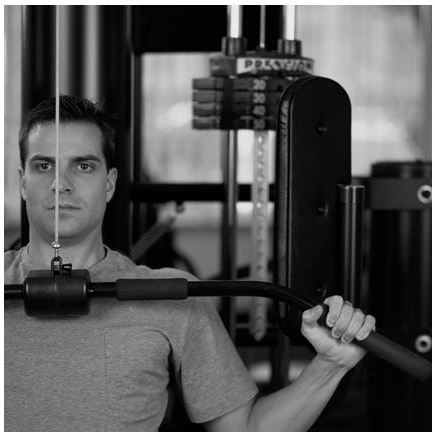
Exercise



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Calculate Net Income

	A	B	C
1	Sales	100	
2	Expenses	80	
3	Net Income	20	=B1-B2

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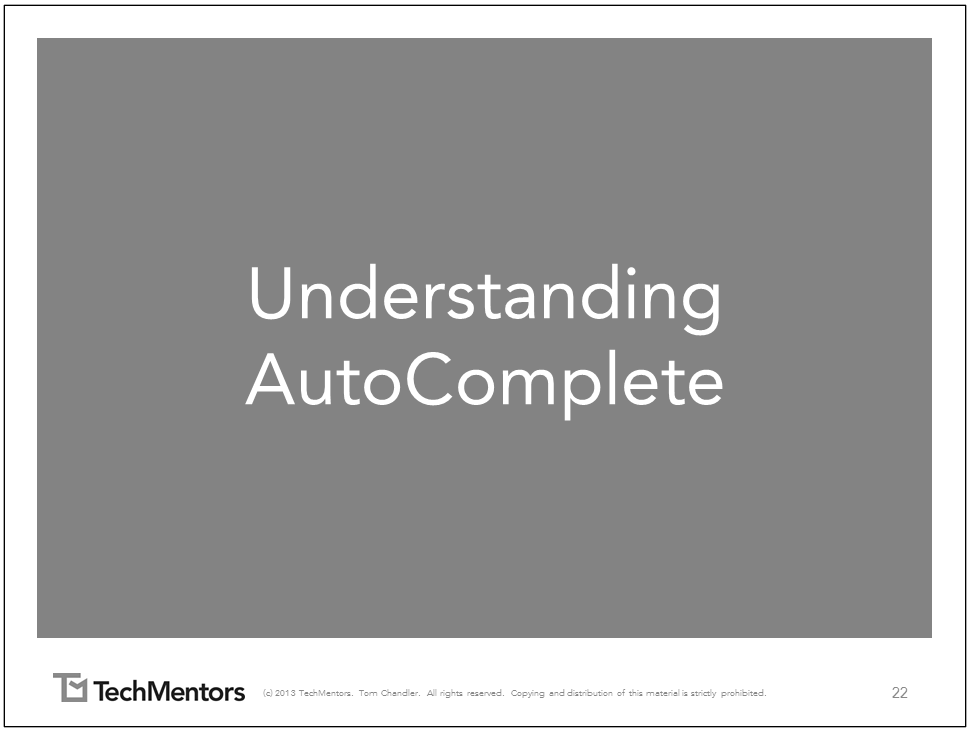
Understanding
AutoComplete
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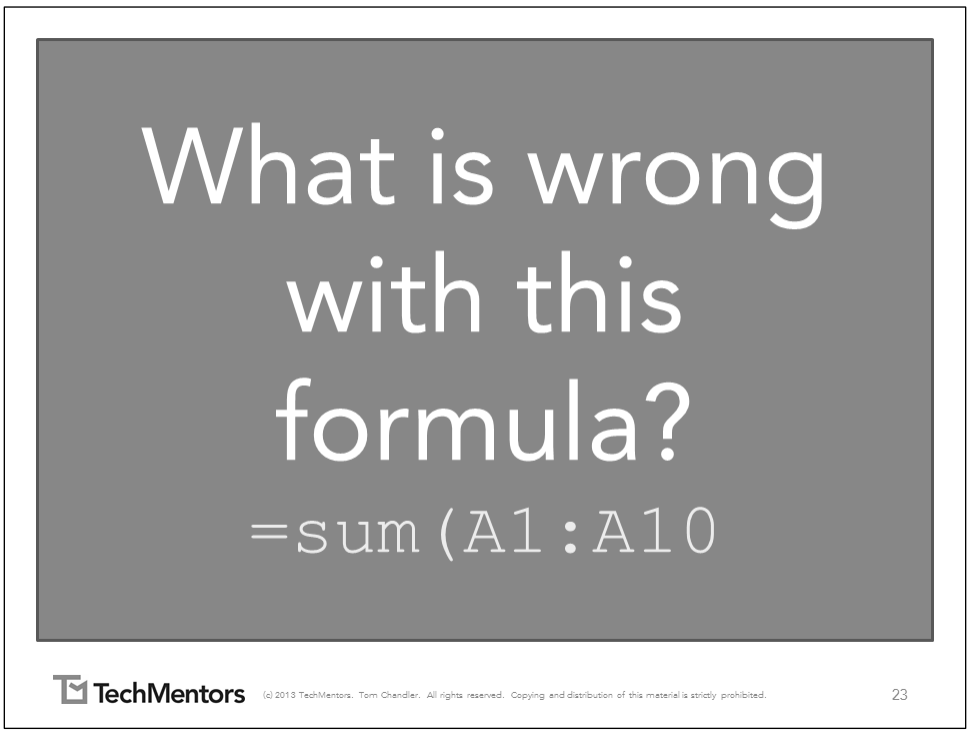
What is wrong
with this
formula?
=sum(A1:A10
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The final parenthesis was missing.

```
=sum(A1:A10)
```

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What will happen if you enter this formula?

```
=sum(A1:A10
```

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Excel's AutoComplete feature will fix it for you!

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Understanding Absolute and Relative References

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What happens when you copy a formula?

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The cells referenced might change

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Relative Reference
Both row and column are relative

	A	B	C	D	E	F	G
1	1	2	3				
2	2	4	6				
3	=A1*2	=B1*2	=C1*2				
4	→						
5							
6	1	2	=A6*2				
7	2	4	=A7*2				
8	3	6	=A8*2				

Copy **across** and the **column letter** changes.

Copy **down** and the **row number** changes.

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Mixed Reference
Absolute Row, Relative Column

	A	B	C	D	E	F	G
1	1	2	3				
2	2	4	6				
3	=A$1*2	=B$1*2	=C$1*2				
4	→						
5	Notice the $ in front of the row						
6	1	2	=A$6*2				
7	2	2	=$A$6*2				
8	3	2	=$A$6*2				

Copy **across** and the **column letter** changes.

Copy **down** and the **row number** doesn't change.

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Mixed Reference
Relative Row, Absolute Column

	A	B	C	D	E	F	G
1	1	2	3				
2	2	2	2				
3	=$A1*2	=$A1*2	=$A1*2				
4							
5							
6	1	2	=$A6*2				
7	2	4	=$A7*2				
8	3	6	=$A8*2				

Copy **across** and the **column letter** doesn't change.

Notice the $ in front of the column

Copy **down** and the **row number** changes.

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Absolute Reference
Both row and column are absolute

	A	B	C	D	E	F	G
1	1	2	3				
2	2	2	2				
3	=$A$1*2	=$A$1*2	=$A$1*2				
4							
5							
6	1	2	=$A$6*2				
7	2	2	=$A$6*2				
8	3	2	=$A$6*2				

Copy **across** and the **column letter** doesn't change.

Notice the $ in front of both

Copy **down** and the **row number** doesn't change.

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Named Ranges

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Named Ranges are useful

	A	B	C
1	Sales	100	
2	Expenses	80	
3	Net Income	=Sales-Expenses	

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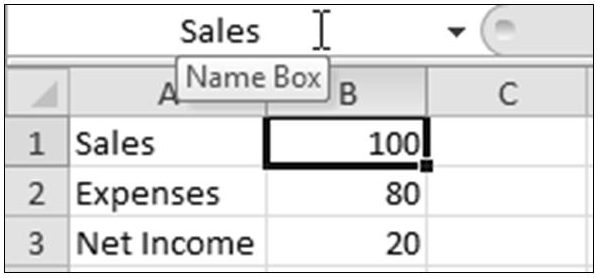
The Name Box



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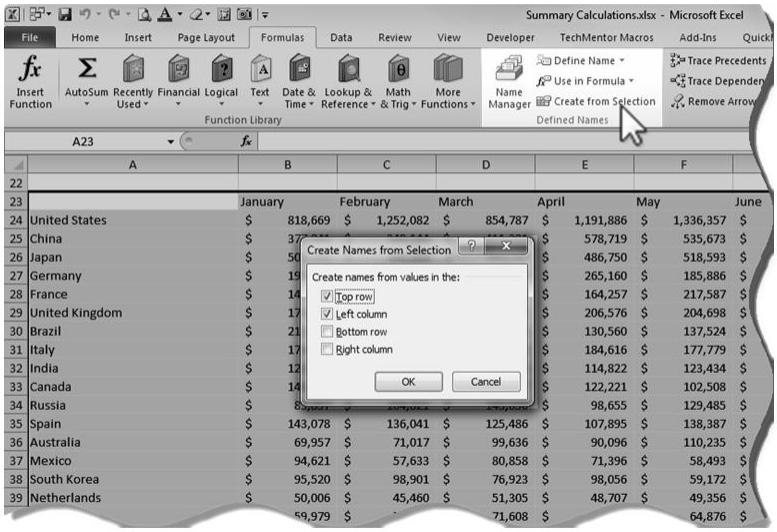
Creating Multiple Names



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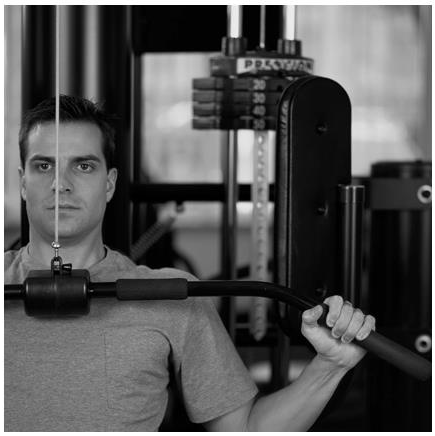
Exercise



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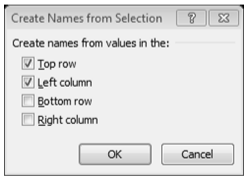
Exercise – Named Ranges

1. Open Yr2002
2. Press Ctrl *
3. Formulas, Defined Names, Create from Selection
4. Check Top row and Left column
5. Click OK.
6. Save the file.



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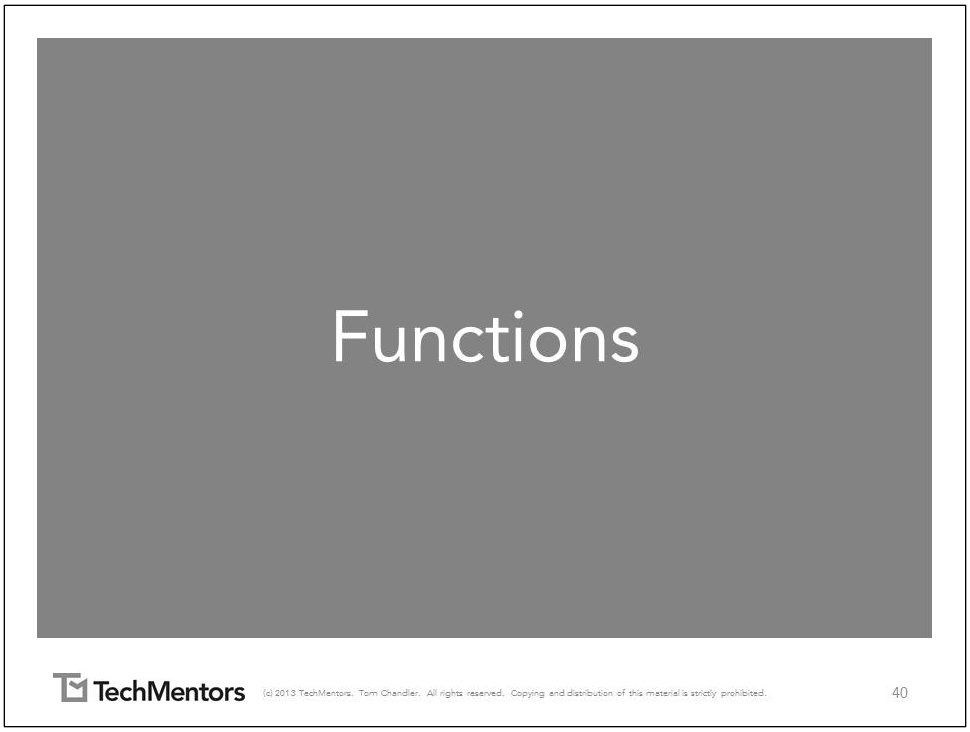
Functions
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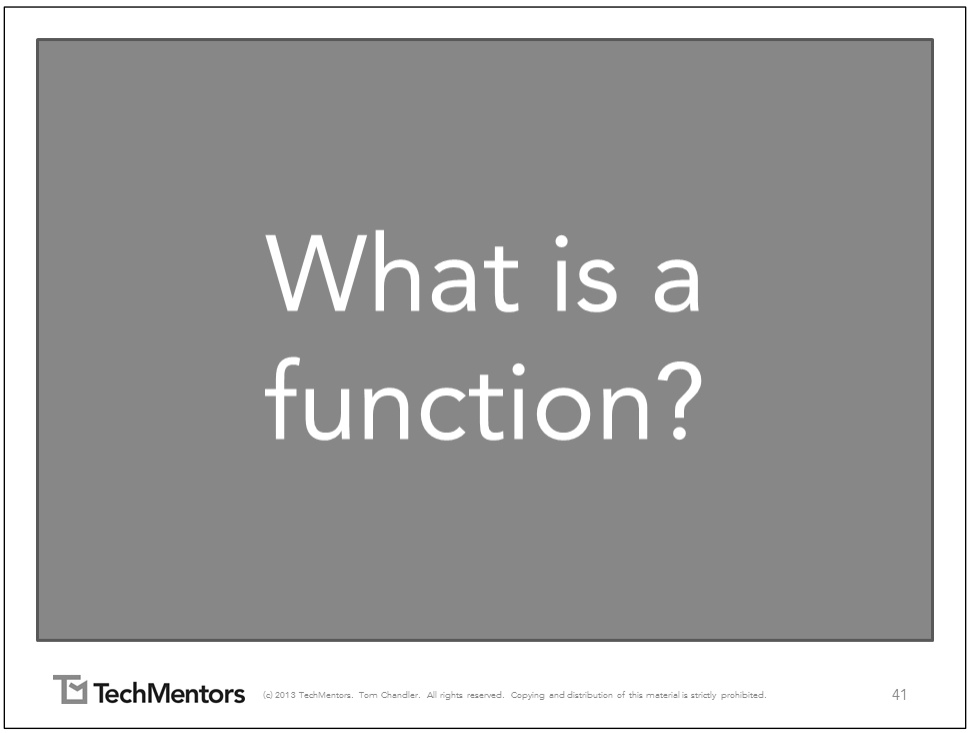
What is a function?
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Function

a computer subroutine;
specifically one that performs a calculation with variables provided by a program and supplies the program with a single result.

Merriam-Webster's 11th Collegiate Dictionary

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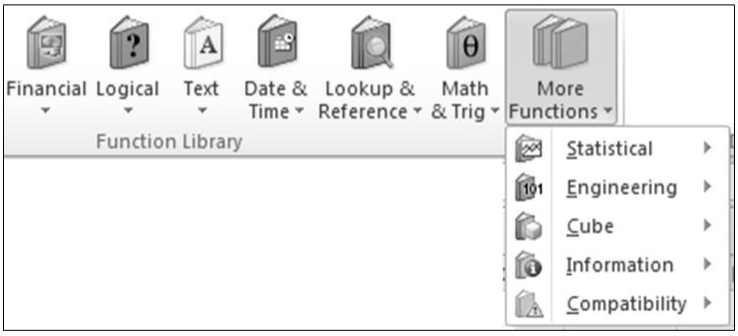
Functions

Excel 2010 has 400+ functions. They are grouped into multiple categories.



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Functions can get complex

```
=VLOOKUP(I2,A1:F5407,2)

or

=INDEX(A24:A233,MATCH(LARGE(
INDIRECT(B1),2),
INDIRECT(B1),0),1)
```

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Want some help?

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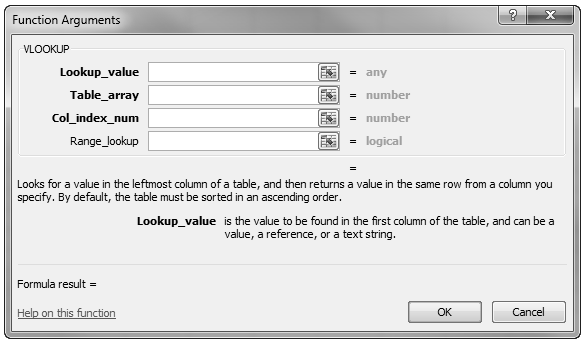
Use the Insert Function command



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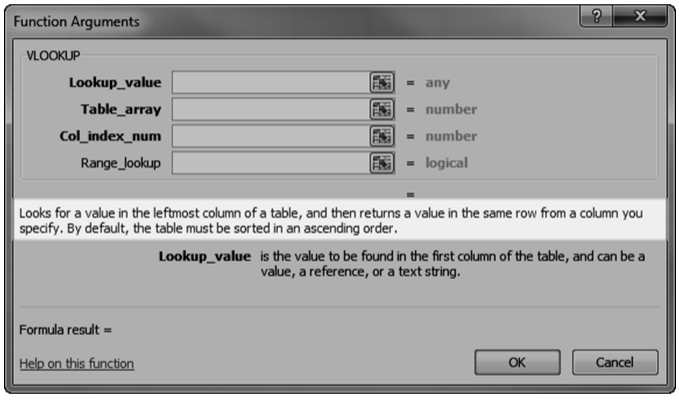
Describes purpose of the function



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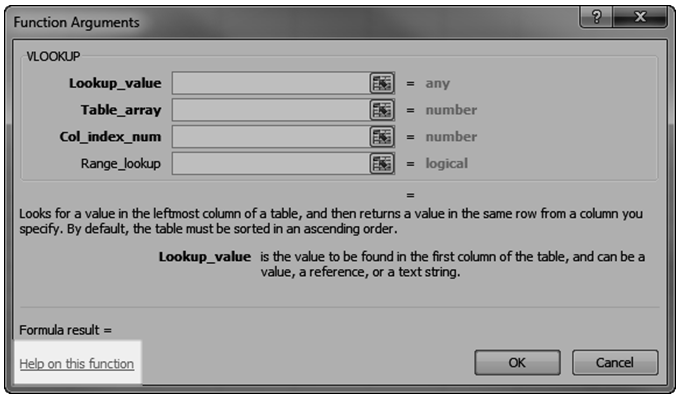
Get Help on this function



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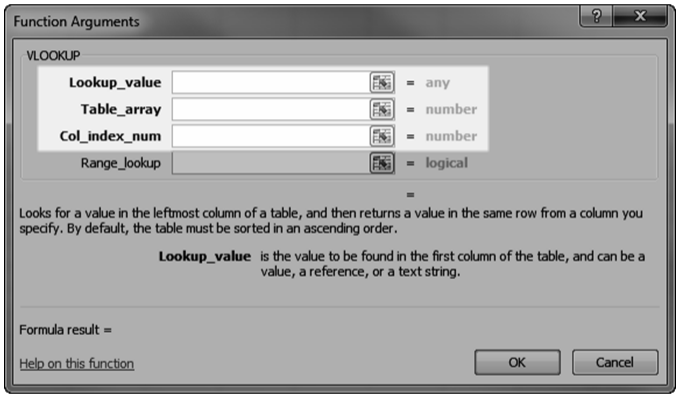
Bold arguments are Required



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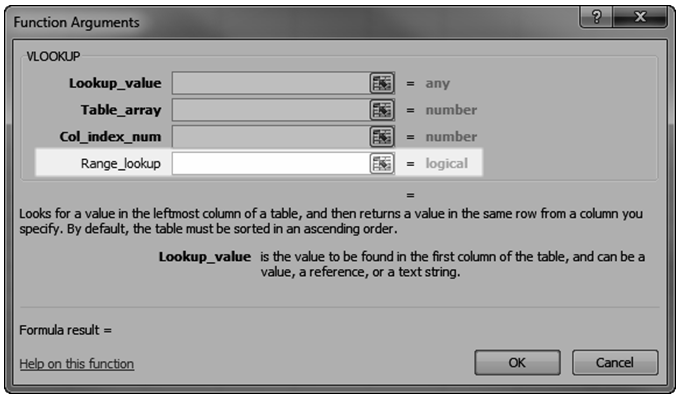
Non bold arguments are Optional



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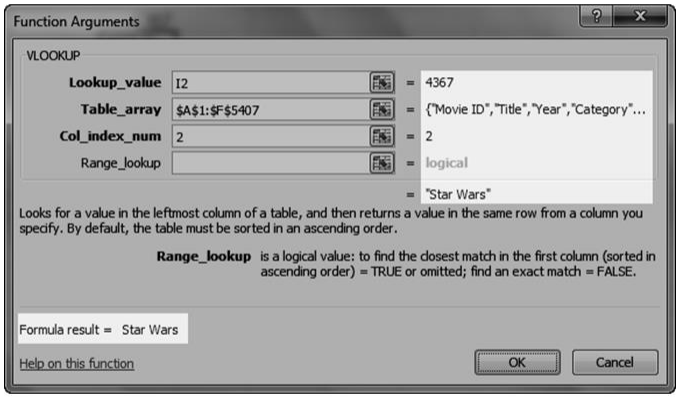
Preview results



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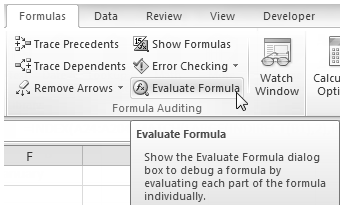
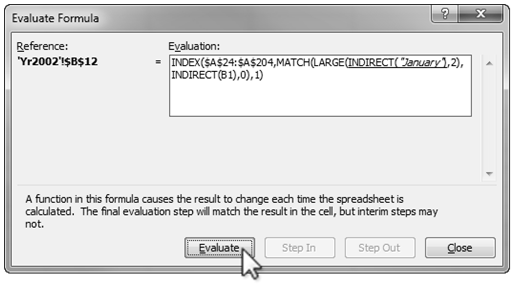
More Help: Evaluate Formula





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Summary Functions

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Sum

Description	Adds all the numbers you specify		
Syntax	SUM(Number1, [Number2]…)		
Arguments	Number1	Required	The first number, cell, or range to be added
	Number2	Optional	The next number, cell, or range to be added
	NumberN	Optional	You can have up 255 number arguments

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Sum

	A	B	C
1		January	
2	United States	$ 866,826	
3	China	$ 583,501	
4	Japan	$ 445,808	
5	Germany	$ 338,968	
6			
7	Sum	$ 2,235,103	=SUM(B2:B5)

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Average

Description	Returns the average value of a group of numbers		
Syntax	Average(Number1, [Number2]…)		
Arguments	Number1	Required	The first number, cell, or range to be averaged
	Number2	Optional	The next number, cell, or range to be averaged
	NumberN	Optional	You can have up 255 number arguments

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Average

	A	B	C
1		January	
2	United States	$ 866,826	
3	China	$ 583,501	
4	Japan	$ 445,808	
5	Germany	$ 338,968	
6			
7	AVERAGE	$ 558,776	=AVERAGE(B2:B5)

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Count

Description	Counts the number of cells that have a numeric value		
Syntax	Count(Value1, [Value2]…)		
Arguments	Value1	Required	The first number, cell, or range to be counted
	Value2	Optional	The next number, cell, or range to be counted
	ValueN	Optional	You can have up 255 number arguments

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CountA

Description	Counts the number of cells that have a non-blank value		
Syntax	CountA(Value1, [Value2]…)		
Arguments	Value1	Required	The first number, cell, or range to be counted
	Value2	Optional	The next number, cell, or range to be counted
	ValueN	Optional	You can have up 255 number arguments

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Count / CountA

	A	B	C
1		January	
2	United States	$ 866,826	
3	China	$ 583,501	
4	Japan	$ 445,808	
5	Germany	$ 338,968	
6			
7	COUNT	0	=COUNT(A2:A5)
8	COUNT	4	=COUNT(B2:B5)
9			
10	COUNTA	4	=COUNTA(A2:A5)
11	COUNTA	4	=COUNT(B2:B5)

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Min

Description	Calculates the smallest of a group of values		
Syntax	MIN(Number1, [Number2]…)		
Arguments	Number1	Required	The first number, cell, or range of cells
	Number2	Optional	The next number, cell, or range of cells
	NumberN	Optional	You can have up 255 number arguments

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Max

Description	Calculates the largest value of a group of values		
Syntax	MAX(Number1, [Number2]…)		
Arguments	Number1	Required	The first number, cell, or range of cells
	Number2	Optional	The next number, cell, or range of cells
	NumberN	Optional	You can have up 255 number arguments

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Small

Description	Calculates the Kth smallest value of a group of values		
Syntax	SMALL(Array, K)		
Arguments	Array	Required	The numbers or cells that have the data
	K	Required	The position within the array. If K is 2 the function returns the 2nd smallest value.

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Large

Description	Calculates the Kth biggest value of a group of values		
Syntax	LARGE(Array, K)		
Arguments	Array	Required	The numbers or cells that have the data
	K	Required	The position within the array. If K is 2 the function returns the 2nd biggest value.

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Median

Description	Calculates the number that is in the middle of a set of numbers		
Syntax	MEDIAN(Number1, [Number2]…)		
Arguments	Number1	Required	The first number, cell, or range of cells
	Number2	Optional	The next number, cell, or range of cells
	NumberN	Optional	You can have up 255 number arguments

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Mode

Description	Calculates the number that occurs most frequently in a set of numbers		
Syntax	MODE(Number1, [Number2]…)		
Arguments	Number1	Required	The first number, cell, or range of cells
	Number2	Optional	The next number, cell, or range of cells
	NumberN	Optional	You can have up 255 number arguments

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CountIf

Description	Counts the number of cells in a range that match a given criteria		
Syntax	COUNTIF(Range, Criteria)		
Arguments	Range	Required	The set of cells to count
	Criteria	Required	The condition the cells must match in order to be counted

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CountIfs

Description	Counts the number of records in a range that match all the given criteria		
Syntax	COUNTIFS(Criteria_range1, Criteria1, [Criteria_range2],[Criteria2]…)		
Arguments	Criteria_range1	Required	The first set of cells to be evaluated
	Criteria	Required	The criteria the first set must match
	Criteria_range2	Optional	The second set of cells to be evaluated
	Criteria2	Optional	The criteria the first set must match
Notes	The criteria can be literal text or cell references. Literal criteria should be placed inside quotes. Operators like =, >, < can be used as part of the criteria Use ? and * as wildcards to represent one or multiple characters.		

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SumIf

Description	Sums the number of cells in a range that match a given criteria		
Syntax	SUMIF(Range, Criteria, [Sum_range])		
Arguments	Range	Required	The set of cells to test
	Criteria	Required	The condition the cells must match in order to be added
	Sum_range	Optional	The cells that are to be added. If left blank the cells in the range parameter are used.

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SumIfs

Description	Sums the number of cells in a range that match all the given criteria		
Syntax	SUMIFS(Criteria_range1, Criteria1, [Criteria_range2],[Criteria2]…)		
Arguments	Sum_range	Required	The cells that are to be added
	Criteria_range1	Required	The first set of cells to be evaluated
	Criteria	Required	The criteria the first set must match
	Criteria_range2	Optional	The second set of cells to be evaluated
	Criteria2	Optional	The criteria the first set must match
Notes	The criteria can be literal text or cell references. Literal criteria should be placed inside quotes. Operators like =, >, < can be used as part of the criteria Use ? and * as wildcards to represent one or multiple characters.		

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Lookup Functions

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Indirect

Description	References the cell or range of cells specified by a string of text		
Syntax	INDIRECT(Ref_text, [A1])		
Arguments	Ref_text	Required	The string of text that states the cell, range of cells, or named range that you wish to refer to
	A1	Optional	Specifies the reference style. Enter FALSE to use the R1C1 reference style. Leave blank or enter TRUE to use the A1 reference style.

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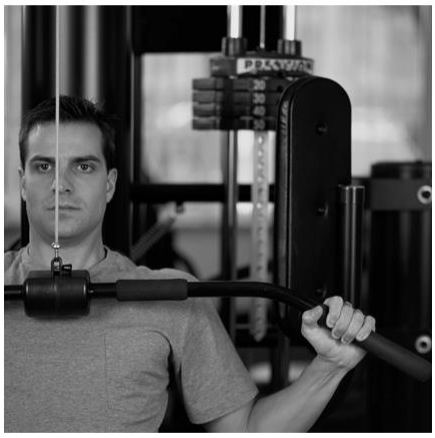
Exercise



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Review Exercise

1. Open Summary Calculations.xlsx
2. Under your instructor's direction enter formulas on the Yr2002 sheet using the instructions on the following sheets:
   - Instructions 1
   - Instructions 2
   - Instructions 3
   - Instructions 4

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Match

Description	Calculates the position of a value in a range of cells		
Syntax	MATCH(Lookup_value, Lookup_array, [match_type])		
Arguments	Lookup_value	Required	The value you want to find
	Lookup_array	Required	The range of cells that will contain the lookup_value
	Match_type	Optional	Leave blank or enter 1 to find the closest value without going over. The data must be sorted in **ascending** order. Enter 0 to find an exact match. Enter -1 to find the closest value without going under. The data must be in **descending** order.

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Index

Description	Determines the value from a table or range of cells that is at the intersection of the specified row number and column number.		
Syntax	INDEX(Array, Row_num, [Column_num])		
Arguments	Array	Required	The table or range of cells
	Row_num	Required	Specifies the desired row number, relative to the range of cells.
	Column_num	Optional	Specifies the desired column number, relative to the range of cells.

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Offset

Description	References a cell or range of cells that is the specified # of rows down and the specified # of columns to the right of the original reference.		
Syntax	OFFSET(Reference, Rows, Cols, [Height], [Width])		
Arguments	Reference	Required	References the original cell or range of cells
	Rows	Required	Specifies the number of rows down from the original reference. Use negative for rows up.
	Cols	Required	Specifies the number of columns to the right from the original reference. Use negative for columns to the left.
	Height	Optional	Enter the number of rows to be referenced
	Width	Optional	Enter the number of columns to be referenced

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What grade did Sally get?

	A	B	C	D	E	F
1	Student	Score	Grade		Score	Grade
2	Sally	75%			0%	F
3	Bob	90%			60%	D
4	June	84%			70%	C
5	Cary	79%			80%	B
6					90%	A

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VLOOKUP has the answer!

	A	B	C	D	E	F
1	Student	Score	Grade		Score	Grade
2	Sally	75%	C		0%	F
3	Bob	90%			60%	D
4	June	84%			70%	C
5	Cary	79%			80%	B
6					90%	A
7						
8		=VLOOKUP(B2,$E$2:$F$6,2,TRUE)				

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Why is it called VLookup?

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Because it is a Vertical lookup.

	A	B	C	D	E	F
1	Student	Score	Grade		Score	Grade
2	Sally	75%			0%	F
3	Bob	90%			60%	D
4	June	84%			70%	C
5	Cary	79%			80%	B
6					90%	A

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VLookup

Description	Looks for a value in the first column of a table and then returns the value from the specified column of that same row		
Syntax	VLOOKUP(Lookup_value, Table_array, Col_index_num, [Range_lookup])		
Arguments	Lookup_value	Required	The value to find
	Table_array	Required	The table or range of cells where the value can be found
	Col_index_num	Required	The column number in the table from which the value is to be returned
	Range_lookup	Optional	Leave blank or enter TRUE to find the closest match, enter FALSE to find only an exact match
Notes	Unless the Range_lookup specifies an exact match, the data must be sorted in ascending order.		

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VLookup Arguments

=VLOOKUP(B2,$E$2:$F$6,2,TRUE)

Lookup_ value	Table_ array	Col_index_ num	Range_ Lookup
What ?	Where ?	Which column?	Approximate ?
B2	$E2:$F$6	2	True

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Is there a horizontal lookup?

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Yes its called HLookup!

	A	B	C	D	E	F	G	H	I	J
1	Student	Score	Grade		Score	0%	60%	70%	80%	90%
2	Sally	75%	C		Grade	F	D	C	B	A
3	Bob	90%								
4	June	84%								
5	Cary	79%								
6										
7										
8										

=HLOOKUP(B2,$E$1:$J$2,2,TRUE)

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HLookup

Description	Looks for a value in the first row of a table and then returns the value from the specified row of that same column		
Syntax	HLOOKUP(Lookup_value, Table_array, Row_index_num, [Range_lookup])		
Arguments	Lookup_value	Required	The value to find
	Table_array	Required	The table or range of cells where the value can be found
	Row_index_num	Required	The row number in the table from which the value is to be returned
	Range_lookup	Optional	Leave blank or enter TRUE to find the closest match, enter FALSE to find only an exact match
Notes	Unless the Range_lookup specifies an exact match, the data must be sorted in ascending order.		

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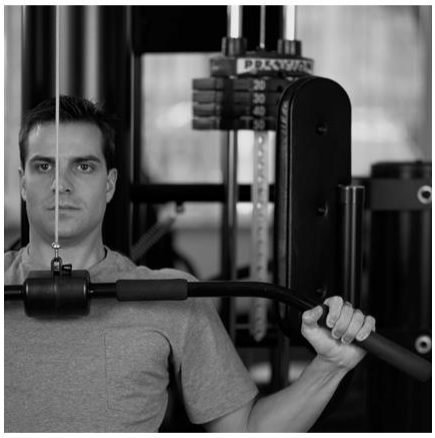
Exercise



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Review Exercise

1. Open Grades.xlsx
2. In column C enter the appropriate VLookup functions to calculate the grades.

	A	B	C	D	E	F
1	Student	Score	Grade		Grade	Score
2	Sally	75%			A	90%
3	Bob	90%			B	80%
4	June	84%			C	70%
5	Cary	79%			D	60%
6					F	0%

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Round Functions

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Round

Description	Round a number to the specified number of digits		
Syntax	ROUND(Number, Num_digits)		
Arguments	Number	Required	The original number
	Num_digits	Required	The number of digits you want the number rounded to. You can enter a negative number to round to the left of the decimal place. Enter 0 to round to the nearest whole number.

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RoundUp

Description	Round a number up to the specified number of digits		
Syntax	ROUNDUP(Number, Num_digits)		
Arguments	Number	Required	The original number
	Num_digits	Required	The number of digits you want the number rounded to. You can enter a negative number to round to the left of the decimal place. Enter 0 to round to the nearest whole number.

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RoundDown

Description	Round a number down to the specified number of digits		
Syntax	ROUNDDOWN(Number, Num_digits)		
Arguments	Number	Required	The original number
	Num_digits	Required	The number of digits you want the number rounded to. You can enter a negative number to round to the left of the decimal place. Enter 0 to round to the nearest whole number.

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MRound

Description	Round a number to the nearest multiple of the specified number		
Syntax	MROUND(Number, Multiple)		
Arguments	Number	Required	The original number
	Multiple	Required	The result will be a multiple of this number. For example enter a 2 and the result will be the nearest even number.

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Ceiling

Description	Rounds a number up (to the ceiling) to the nearest multiple of the significance argument		
Syntax	CEILING(Number, Significance)		
Arguments	Number	Required	The original number
	Significance	Required	The result will be a multiple of this number. For example enter a 2 and the result will be the nearest even number.

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Floor

Description	Rounds a number down (to the floor) to the nearest multiple of the significance argument		
Syntax	FLOOR(Number, Significance)		
Arguments	Number	Required	The original number
	Significance	Required	The result will be a multiple of this number. For example enter a 2 and the result will be the nearest even number.

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Int

Description	Rounds a number down to the nearest integer		
Syntax	INT(Number)		
Arguments	Number	Required	The original number

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Odd

Description	Rounds a positive number up to the nearest odd number. Rounds a negative number down to the nearest odd number.		
Syntax	ODD(Number)		
Arguments	Number	Required	The number that is to be rounded

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Even

Description	Rounds a positive number up to the nearest even number. Rounds a negative number down to the nearest even number.		
Syntax	EVEN(Number)		
Arguments	Number	Required	The number that is to be rounded

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Math Functions

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Abs

Description	Calculates the absolute value (number with out a negative sign) of the specified number		
Syntax	ABS(Number)		
Arguments	Number	Required	The specified number

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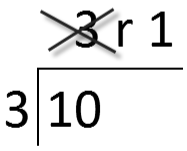
Mod

Description	Calculates the remainder that is left over after dividing a number by a divisor		
Syntax	MOD(Number, Divisor)		
Arguments	Number	Required	The number that is to be divided
	Divisor	Required	The number by which you divide the original number



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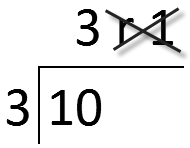
Quotient

Description	Calculates the integer (non-decimal) portion after dividing a number by a divisor		
Syntax	MOD(Numerator, Denominator)		
Arguments	Numerator	Required	The number that is to be divided
	Denominator	Required	The number by which you divide the original number



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Roman

Description	Converts a number into its Roman numeral equivalent		
Syntax	ROMAN(Number, [Form])		
Arguments	Number	Required	The number you want converted
	Form	Optional	Enter 0, TRUE, or blank for the classic roman numeral style. Enter a number between 1 and 3 for a more concise version is displayed. Enter 4 or FALSE for a simplified version.

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Percentile

Description	Calculates the K-th percentile of the range of values		
Syntax	PERCENTILE (Array, K)		
Arguments	Array	Required	The range of cells that has the numbers
	K	Required	The desired percentile value. This value must be a decimal between 0 and 1.
Notes	This function only exists to maintain compatability with versions prior to Excel 2010.		

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Percentile.inc

Description	Calculates the K-th percentile of the range of values		
Syntax	PERCENTILE.INC(Array, K)		
Arguments	Array	Required	The range of cells that has the numbers
	K	Required	The desired percentile value. This value must be a decimal between 0 and 1 **inclusively**.
Notes	This function did not exist prior to Excel 2010		

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Percentile.exc

Description	Calculates the K-th percentile of the range of values		
Syntax	PERCENTILE.EXC(Array, K)		
Arguments	Array	Required	The range of cells that has the numbers
	K	Required	The desired percentile value. This value must be a decimal between 0 and 1 **exclusively**.
Notes	This function did not exist prior to Excel 2010		

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Quartile

Description	Calculates the specified quartile of the range of values		
Syntax	QUARTILE(Array, Quart)		
Arguments	Array	Required	The range of cells that has the numbers
	Quart	Required	The desired quartile value. Enter 0 for minimum; 1 for 1st Quartile, 2 for median; 3 for 3rd Quartile; 4 for maximum value.
Notes	This function only exists to maintain compatibility with versions prior to Excel 2010.		

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Quartile.inc

Description	Calculates the specified quartile of the range of values, based on percentile values from 0 through 1 **inclusive**.		
Syntax	QUARTILE.INC(Array, Quart)		
Arguments	Array	Required	The range of cells that has the numbers
	Quart	Required	The desired quartile value. Enter 0 for minimum; 1 for 1st Quartile, 2 for median; 3 for 3rd Quartile; 4 for maximum value.
Notes	This function did not exist prior to Excel 2010		

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Quartile.exc

Description	Calculates the specified quartile of the range of values, based on percentile values from 0 through 1 **exclusive**.		
Syntax	QUARTILE.EXC(Array, Quart)		
Arguments	Array	Required	The range of cells that has the numbers
	Quart	Required	The desired quartile value. Enter 1 for 1st Quartile, 2 for median; 3 for 3rd Quartile.
Notes	This function did not exist prior to Excel 2010		

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Random Number Generators

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Rand

Description	Calculates a random number that is greater than or equal to 0 and less than 1.
Syntax	RAND()
Arguments	*This function has no arguments.*

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RandBetween

Description	Calculates an integer between the top and bottom number you specify.		
Syntax	RANDBETWEEN(Bottom, Top)		
Arguments	Bottom	Required	The smallest possible integer you want returned.
	Top	Required	The largest possible integer you want returned.

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Text Functions

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Concatenate

Description	Combines multiple text strings together		
Syntax	CONCATENATE(Text1, [Text2])		
Arguments	Text1	Required	A cell value or expression for the first text string.
	Text2	Optional	A cell value or expression for the second text string. You can have up 255 Text expressions.

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Left

Description	Get the specified number of characters from the left side of the specified text.		
Syntax	LEFT(Text, [Num_chars])		
Arguments	Text	Required	The original text
	Num_chars	Optional	Number of characters to return from the left side of the function. If omitted one character is returned.

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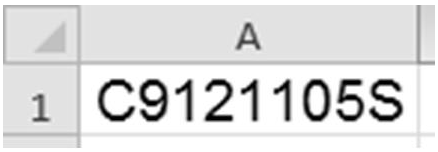
Left



	A
1	C9121105S

=Left(A1, 4)

C912

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Right

Description	Get the specified number of characters from the right side of the specified text.		
Syntax	RIGHT(Text, [Num_chars])		
Arguments	Text	Required	The original text
	Num_chars	Optional	Number of characters to return from the right side of the function. If omitted one character is returned.

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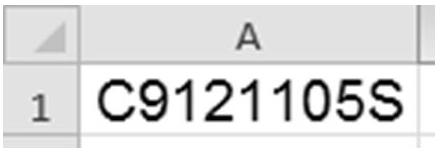
Right



	A
1	C9121105S

=Right(A1, 4)

105S

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Mid

Description	Gets the specified number of characters from the middle of the specified text starting at the specified character.		
Syntax	MID(Text, Start_num, Num_chars)		
Arguments	Text	Required	The original text
	Start_num	Required	The position, from the left side, of the first character to extract.
	Num_chars	Required	Specifies the number of characters to return.

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Mid

	A
1	C9121105S

=MID(A1, 3, 6)

121105

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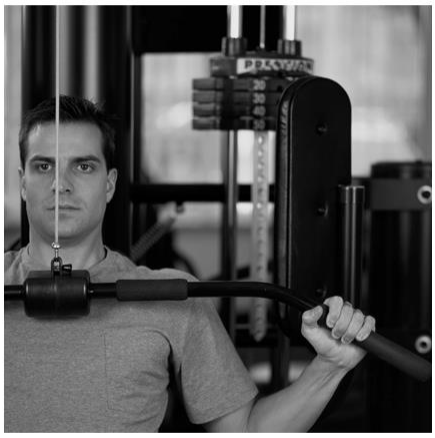
Exercise



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Extract the date

	A
1	C9121105S

=(MID(A1, 3, 2) & "/" &
MID(A1, 5, 2) & "/" &
MID(A1, 7, 2))

12/11/05

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Clean

Description	Cleans or removes all nonprintable characters from the specified text		
Syntax	CLEAN(text)		
Arguments	Text1	Required	A cell value or expression for the text that is to be cleaned.

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Trim

Description	Removes spaces from the beginning and ending of the specified text. It also, from the middle of the specified text, replaces any series of two more spaces with a single space.		
Syntax	TRIM(text)		
Arguments	Text1	Required	A cell value or expression for the text that is to be trimmed.

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Exact

Description	Checks if two text strings are exactly the same.		
Syntax	EXACT(Text1, Text2)		
Arguments	Text1	Required	A cell value or expression for the first text string.
	Text2	Optional	A cell value or expression for the second text string.

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Find

Description	Finds the specified text within the specified text expression and returns the character position of the found text. The find is case-sensitive.		
Syntax	FIND(Find_text, Within_text)		
Arguments	Find_text	Required	The text you want to find
	Within_text	Required	The text to be searched
	Start_num	Optional	Specifies the character number where the search is to begin

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Search

Description	Finds the specified text within the specified text expression and returns the character position of the found text. The find is **not** case-sensitive.		
Syntax	SEARCH(Find_text, Within_text)		
Arguments	Find_text	Required	The text you want to find. ? and * can be used as wildcard characters for one or multiple characters.
	Within_text	Required	The text to be searched
	Start_num	Optional	Specifies the character number where the search is to begin

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Upper

Description	Converts text to uppercase letters		
Syntax	UPPER(Text)		
Arguments	Text	Required	The text you want to convert.

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Lower

Description	Converts text to lowercase letters		
Syntax	LOWER(Text)		
Arguments	Text	Required	The text you want to convert.

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Proper

Description	Converts text to uppercase letters		
Syntax	PROPER(Text)		
Arguments	Text	Required	The text you want to convert.

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Replace

Description	Replaces part of the original text with the specified new text		
Syntax	REPLACE(Old_text, Start_num, Num_chars, New_text)		
Arguments	Old_text	Required	The original text
	Start_num	Required	The starting position of the text you want to replace
	Num_chars	Required	The number of characters to remove
	New_text	Required	The new text to be inserted at the specified start_num.

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Substitute

Description	Substitutes new text in place of old text		
Syntax	SUBSTITUTE(Text, Old_text, New_text, [Instance_num])		
Arguments	Text	Required	The original text
	Old_text	Required	The text you want to replace
	New_text	Required	The new text that replaces the old text
	Instance_Num	Optional	Identifies which occurrence of the old_text is to be replaced. Leave blank to replace all occurrences.

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Rept

Description	Repeats the specified text the number of times specified		
Syntax	REPT(Text, Number_times)		
Arguments	Text	Required	The text you want to repeat
	Number_times	Required	Number of times the text is to be repeated

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Value

Description	Converts the specified text into its numeric equivalent. If no equivalent numeric value exists then a #VALUE! error is returned.		
Syntax	VALUE(Text)		
Arguments	Text	Required	The text you want to convert

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Logical Functions

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If

Description	Evaluates a logical expression. If the expression is true one value is returned, if not another value is returned.		
Syntax	IF(Logical_test, [Value_if_true], [Value_if_false])		
Arguments	Logical_ test	Required	The expression that is either TRUE or FALSE
	Value_if_ true	Optional	The value you want returned if the logical expression is TRUE
	Value_if_ false	Optional	The value you want returned if the logical expression is FALSE

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And

Description	Determines if all the arguments are TRUE		
Syntax	AND(Logical1, [Logical2])		
Arguments	Logical1	Required	Expression that results in either TRUE or FALSE
	Logical2	Optional	Expression that results in either TRUE or FALSE
	LogicalN	Optional	Expression that results in either TRUE or FALSE You can have up 255 logical expressions.

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Or

Description	Determines if any of the arguments are TRUE		
Syntax	OR(Logical1, [Logical2])		
Arguments	Logical1	Required	Expression that results in either TRUE or FALSE
	Logical2	Optional	Expression that results in either TRUE or FALSE
	LogicalN	Optional	Expression that results in either TRUE or FALSE You can have up 255 logical expressions.

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Not

Description	Changes FALSE to TRUE and TRUE to FALSE		
Syntax	NOT(Logical)		
Arguments	Logical	Required	Expression that results in either TRUE or FALSE

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Information Functions

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Cell

Description	Computes information about the cell or range of referenced				
Syntax	CELL(Info_type, [Reference])				
Arguments	Info_type	Required	Specifies the type of information you want.		
			• Address • Col • Color • Contents	• Filename • Format • Parentheses • Prefix	• Protect • Row • Type • Width
	Reference	Optional	Specifies the cell or range of cells the information will be based on. Leave blank to refer to the cell that contains the formula.		
Notes	See the Help file for more information about the various info_types.				

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Row

Description	Returns the row number of the specified cell reference		
Syntax	ROW(Reference)		
Arguments	Reference	Required	The specified cell reference

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Column

Description	Returns the column number of the specified cell reference		
Syntax	COLUMN(Reference)		
Arguments	Reference	Required	The specified cell reference

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Address

Description	Returns the address of the cell at the specified row number, column number		
Syntax	ADDRESS(Row_num, Column_num, [Abs_num], [A1], [Sheet_text])		
Arguments	Row_num	Required	The number of the row
	Column_num	Required	The number, not letter, of the column
	Abs_num	Optional	Enter 1 for absolute reference $A$1 Enter 2 for mixed reference A$1 Enter 3 for mixed reference $A1 Enter 4 for relative reference A1
	A1	Optional	Leave blank or enter TRUE or 1 for A1 reference style. Enter 0 or FALSE for R1C1 reference type
	Sheet_text	Optional	The name of the sheet that own the cell

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IsBlank

Description	Determines if a cell is blank. Result is either TRUE or FALSE.		
Syntax	ISBLANK(Value)		
Arguments	Value	Required	The cell you want evaluated.
Notes	A cell with just a space is not blank and will therefore return FALSE.		

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IsNumber

Description	Determines if a value is a number. Result is either TRUE or FALSE.		
Syntax	ISNUMBER(Value)		
Arguments	Value	Required	The cell or expression you want evaluated.

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IsNonText

Description	Determines if a value is not text. Result is either TRUE or FALSE.		
Syntax	ISNONTEXT(Value)		
Arguments	Value	Required	The cell or expression you want tested.
Notes	Blanks cells are not text and therefore return a TRUE value		

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IsText

Description	Determines if a value is text. Result is either TRUE or FALSE.		
Syntax	ISTEXT(Value)		
Arguments	Value	Required	The cell or expression you want tested.
Notes	Blanks cells are not text and therefore return a FALSE value		

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IsErr

Description	Determines if a cell returns any of the following errors: #VALUE!, #REF, #DIV/0, #NUM!, #NAME?, #NULL!		
Syntax	ISERR(Value)		
Arguments	Value	Required	The cell or expression you want tested.
Notes	This function will return FALSE for the value #N/A because this function considers #N/A to not be an error.		

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IsError

Description	Determines if a cell returns any of the following errors: #VALUE!, #REF, #DIV/0, #NUM!, #NAME?, #NULL!, #N/A		
Syntax	ISERR(Value)		
Arguments	Value	Required	The cell or expression you want tested.
Notes	This function will return TRUE for the value #N/A because this function considers #N/A to be an error.		

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IsNA

Description	Determines if a cell returns an #N/A value		
Syntax	ISNA(Value)		
Arguments	Value	Required	The cell or expression you want tested.

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Date Functions

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EoMonth

Description	Returns the day that is the end of the month for the specified number of months after the specified date		
Syntax	EOMONTH(Start_Date, Months)		
Arguments	Start_Date	Required	The starting or original date
	Months	Optional	The number of months before (negative) or after (positive) the starting date
Notes	You may need to change the number format to a date in order to know which date is computed.		

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EDate

Description	Returns the day that is the specified number of months after the specified date		
Syntax	EDATE(Start_Date, Months)		
Arguments	Start_Date	Required	The starting or original date
	Months	Optional	The number of months before (negative) or after (positive) the starting date
Notes	You may need to change the number format to a date in order to know which date is computed.		

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Networkdays

Description	Calculates the number of whole working days between the specified start and end dates		
Syntax	NETWORKDAYS(Start_date, End_date, [Holidays])		
Arguments	Start_date	Required	The first date
	End_date	Required	The last date
	Holidays	Optional	A range of cells containing holidays to exclude from the working calendar

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Weeknum

Description	Calculates the week number of the year of the specified date		
Syntax	WEEKNUM(Serial_number, Return_type)		
Arguments	Serial_number	Required	The specified date
	Return_type	Optional	A number that determines which day is the first day of the week Leave blank or enter 1 for Sunday Enter 2 or 11 for Monday Enter 12 for Tuesday Enter 13 for Wednesday Enter 14 for Thursday Enter 15 for Friday Enter 16 for Saturday See Help for more options.

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Workday

Description	Calculates the working day that is the specified number of days after the start date		
Syntax	WORKDAY(Start_date, Days, [Holidays])		
Arguments	Start_date	Required	The starting date
	Days	Required	The number of working days after (positive) or before (negative) the start date
	Holidays	Optional	A range of cells containing holidays to exclude from the working calendar

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Weekday

Description	Calculates the day of the week for a specified day. The value returned is a number such as 1 for Sunday, 2 for Monday,… 7 for Saturday		
Syntax	WEEKDAY(Serial_number, Return_type)		
Arguments	Serial_number	Required	The specified date
	Return_type	Optional	Leave blank or enter 1 when Sunday is the first day of the week. See the Help file for other options.

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Day

Description	Calculates the day of the month, 1 to 31, of the specified date		
Syntax	DAY(Serial_number)		
Arguments	Serial_number	Required	The specified date

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Month

Description	Calculates the month of the year, 1 (January) to 12 (December), of the specified date		
Syntax	MONTH(Serial_number)		
Arguments	Serial_number	Required	The specified date

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Year

Description	Calculates the year of the specified date. Will return #VALUE! if the year is prior to 1900.		
Syntax	YEAR(Serial_number)		
Arguments	Serial_number	Required	The specified date

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Now

Description	Computes the current date and time based on the computer's calendar and clock
Syntax	NOW()
Arguments	*This function has no arguments.*

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Today

Description	Computes the current date based on the computer's calendar
Syntax	Today()
Arguments	*This function has no arguments.*

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DateValue

Description	Converts text that appears as a date into the actual date value		
Syntax	DATEVALUE(Date_text)		
Arguments	Date_text	Required	Any text that can represent a date that is between 1/1/1900 (Windows) or 1/1/1904 (Macintosh) and 12/31/1999.

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Date

Description	Calculates the date based on the specified year, month and day		
Syntax	DATE(Year, Month, Day)		
Arguments	Year	Required	The year. Any number from 1900 to 9999 if using Windows. 1904 to 9999 if using a Macintosh.
	Month	Required	The month number.
	Day	Required	The number for the day of the month.
Notes	The Month number is not limited to 1 through 12, and the Day number is not limited to 1 to 31. For example Date(2012,13,1) will return January 1, 2013; and the Date(2012,5,-1) will return April 30, 2012.		

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Extract the date

	A
1	C9121105S

=Date(Year, Month, Day)

=Date(MID(A1, 3, 2),
MID(A1, 5, 2),
MID(A1, 7, 2))

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Linking Cells

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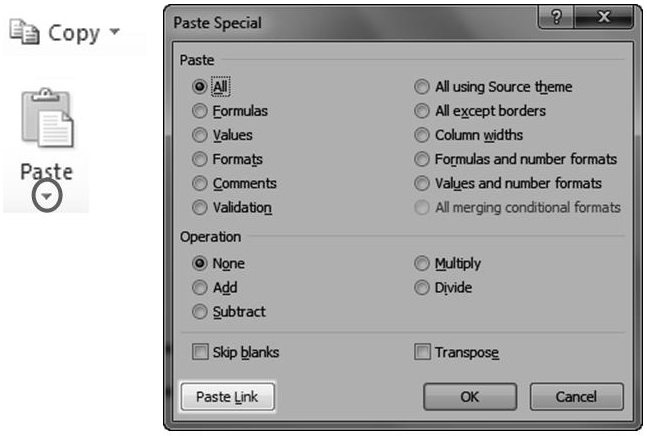
Copy, Paste Special, Paste Link



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Syntax: Same Sheet

=Cell Reference

	A	B	C
1	Sales	$ 100,000	
2	Expenses	$ 82,500	
3	Net Income	$ 17,500	
4			
5	Income before tax	$ 17,500	=$B$3
6	Tax Rate	28%	
7	Income after tax	$ 12,600	

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Syntax: Different worksheet

= Worksheet ! Cell Reference

	A	B	C
1	Income before tax	$17,500	=BalanceSheet!$B$3
2	Tax Rate	28%	
3	Income after tax	$12,600	
4			

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Syntax: Different workbook

= [Workbook] Worksheet ! Cell Reference

	A	B	C
1	Income before tax	$ 17,500	=[Samples.xlsx]BalanceSheet!$B$3
2	Tax Rate	28%	
3	Income after tax	$ 12,600	

	A	B	C
1	Income before tax	$ 17,500	=F:\2012\[Samples.xlsx]BalanceSheet'!$B$3
2	Tax Rate	28%	
3	Income after tax	$ 12,600	

Path is included when the source workbook is closed.

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What happens if I rename the source file?

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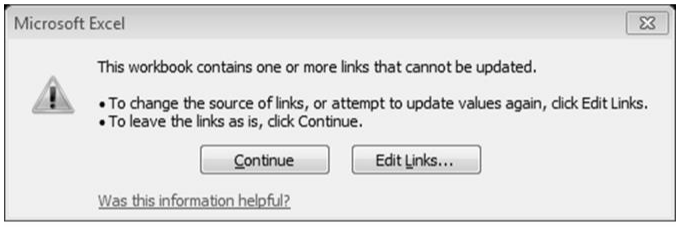
You get a message.



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Can I fix it?

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Yes, just click Edit Links…

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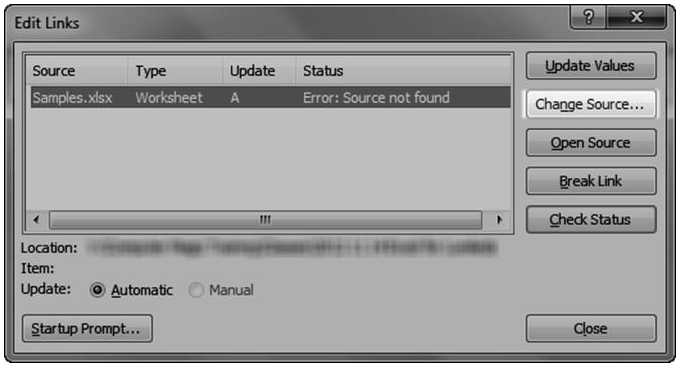
then click Change Source…



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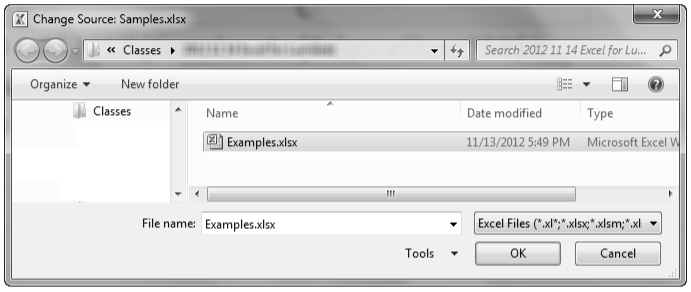
…then pick the correct file.



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Can I convert the links to values?

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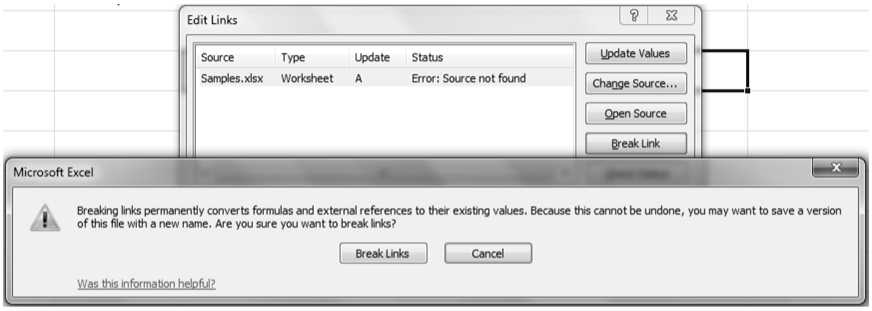
Yes, just click Break Link.



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Complex Formulas

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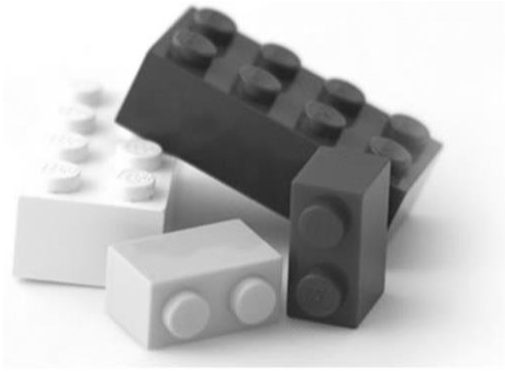
Put the Legos together



Now we can create great things!

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