



FastCourse Series

Chapter 3: Advanced Functions for Text and Analysis



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Learning Objectives

- After studying this chapter, you will be able to:
 - ▲ Use functions to format text
 - ▲ Create conditional functions using IF and IFS criteria
 - ▲ Create formulas using nested functions
 - ▲ Find and correct errors in formulas
 - ▲ Use 3-D cell references in formulas

Using Functions to Modify Text

- Text functions let you change text entries
- Changing case
 - ▲ PROPER converts only the first letter to uppercase
 - ▲ UPPER converts all letters to uppercase
 - ▲ LOWER converts all letters to lowercase

	A	B	C
1	Text	Formula	Result
2	use your IMAGINATION	=PROPER(A3)	Use Your Imagination
3		=LOWER("AND")	and
4	make some magic!	=UPPER(A5)	MAKE SOME MAGIC!

Using Functions to Modify Text (cont.)

■ Extracting text

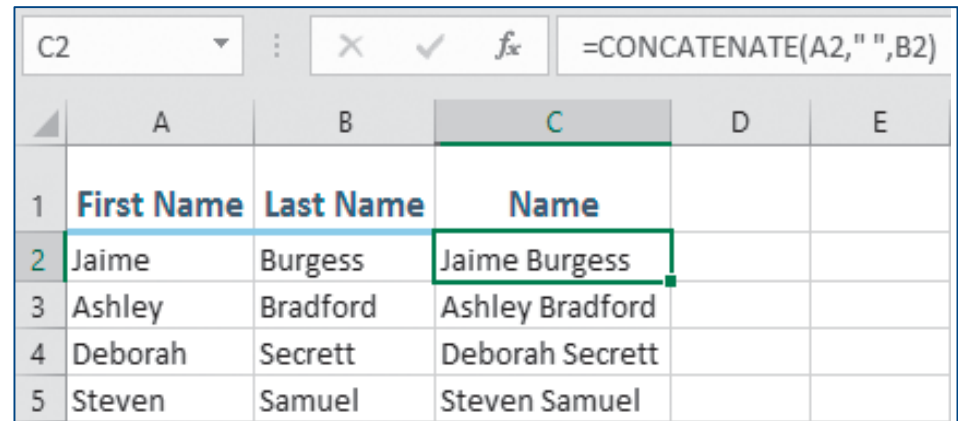
- ▲ LEFT, MID, RIGHT removes a specified number of characters
- ▲ TRIM leaves only a single space between words

	A	B	C
1	Text	Formula	Result
2	BASKabcdefg	=LEFT(A3,4)	BASK
3	abcdefgETB	=RIGHT(A4,3)	ETB
4	abcALLdefg	=MID(A5,4,3)	ALL
5	Who likes basketball?	=TRIM(A6)	Who likes basketball?

Using Functions to Modify Text (cont.)

■ CONCATENATE

combines two or more separate text entries into one cell

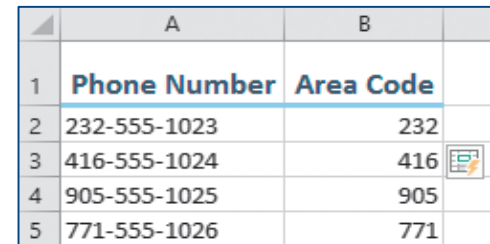


The screenshot shows an Excel spreadsheet with a formula bar at the top displaying `=CONCATENATE(A2," ",B2)`. Below the formula bar is a table with the following data:

	A	B	C	D	E
1	First Name	Last Name	Name		
2	Jaime	Burgess	Jaime Burgess		
3	Ashley	Bradford	Ashley Bradford		
4	Deborah	Secrett	Deborah Secrett		
5	Steven	Samuel	Steven Samuel		

■ Flash Fill options

- ▲ Extracts one part of a cell only
- ▲ Inserts text into a cell
- ▲ Combines two names into one cell
- ▲ Separates one name into two cells



The screenshot shows an Excel spreadsheet with a table of phone numbers and area codes. A Flash Fill icon is visible in the bottom right corner of the table.

	A	B	
1	Phone Number	Area Code	
2	232-555-1023	232	
3	416-555-1024	416	
4	905-555-1025	905	
5	771-555-1026	771	



Using Functions to Modify Text (cont.)

■ Other text functions

TEXT FUNCTIONS		
Function	Description	Example
REPLACE	Replaces part of a text string with a different text string; for example, replacing digits in a credit card number to display 8181-xxxx-xxxx-1188	Cell B1: 8181-3011-1103-1188 Formula: =REPLACE(B1,6,9,"xxxx-xxxx") Result: 8181-xxxx-xxxx-1188
SUBSTITUTE	Looks for an exact match (case-sensitive) and replaces old text with new text if found; for example, replacing Mgr with Manager	Cell B4: Mgr Formula: =SUBSTITUTE(B4,"Mgr","Manager") Result: Manager
LEN	Determines the number of characters in a cell entry	Cell B7: 2223334444 Formula: =LEN(B7) Result: 10
REPT	Repeats text, for example, repeating the letter A five times	Formula: =REPT("A",5) Result: AAAAA



Conditional Functions Using IF Criteria

- Conditional functions: SUM, COUNT, AVERAGE
- IF uses one criterion; IFS use multiple criteria

IF CRITERIA FUNCTIONS	
Function	Arguments [Optional]
SUMIF	=SUMIF(range,criteria,[sum range])
AVERAGEIF	=AVERAGEIF(range,criteria,[average range])
COUNTIF	=COUNTIF(range,criteria)
SUMIFS	=SUMIFS(sum range,range1,criteria1,range2,criteria2...)
AVERAGEIFS	=AVERAGEIFS(average range,range1,criteria1,range2,criteria2...)
COUNTIFS	=COUNTIFS(range1,criteria1,range2,criteria2...)

Conditional Functions Using IF Criteria (cont.)

■ IF Function Syntax

IF CRITERIA FUNCTION ARGUMENTS	
Arguments	Description
Range	These are the cells to be compared with the criteria.
Criteria	They can be a comparison value or text, or an expression using a comparison operator such as =, >, <, >=, <=, <> (not equal to).
Sum range	(Optional) This is the range to be summed, which can be different from the range being compared with the criteria. If Sum range is omitted, the range is summed.
Average range	(Optional) Like Sum range, this is the range to be averaged.

Conditional Functions Using IF Criteria (cont.)

- Function arguments dialog box displays criteria and a preview of the formula result

Formula bar displays the formula

The screenshot shows an Excel spreadsheet with the following data:

	A	B	C
1			
2	Product #	City	Sales
3	2151	Detroit	\$5,083
4	2152	Chicago	\$13,156
5	2152	San Antonio	\$10,096
6	2153	Detroit	\$12,684
7	2153	Chicago	\$5,655
8	2151	San Antonio	\$7,552

The formula bar displays the formula: `=SUMIFS(C3:C12,A3:A12,2152,B3:B12,"San Antonio")`

The Function Arguments dialog box for SUMIFS is open, showing the following arguments:

SUMIFS	
Sum_range	C3:C12 = {5083;13156;10096;12684;5655;7552}
Criteria_range1	A3:A12 = {2151;2152;2152;2153;2153;2151}
Criteria1	2152 = 2152
Criteria_range2	B3:B12 = {"Detroit";"Chicago";"San Antonio";"Detroit";"Chicago";"San Antonio"}
Criteria2	"San Antonio" = "San Antonio"
	= 18736

Multiple criteria and their ranges

Preview of the formula result

Nested Functions

- Create one function inside another function

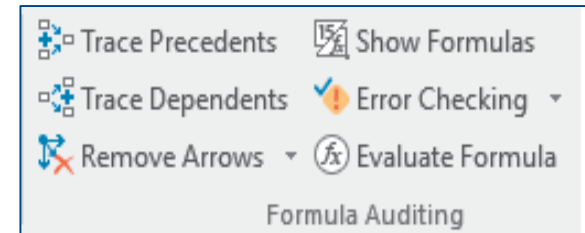
▲ Example: AVERAGE function nested inside a ROUND function



Formula first finds the average for the range, then rounds the results

Troubleshooting Formulas

- Trace Precedents and Trace Dependents auditing tools help identify cells used in a formula



- Trace Precedents works backward to show which cells affect the formula result

Name	Goal	Sales	# Sales
Bert	\$ 1,000	\$ 900	18
Ernie	1,200	1,300	12
Jen	800	950	21
Sarah	1,000	1,200	17
Total	\$ 4,000	\$ 4,350	68
Sales Above Goal			\$ 350
Average Sale			\$ 63.97

Troubleshooting Formulas (cont.)

- Trace Dependents looks forward to show any cells using the current formula cell

Name	Goal	Sales	# Sales
Bert	\$ 1,000	\$ 900	18
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Total	\$ 4,000	\$ 4,350	68
Sales Above Goal		\$ 350	
Average Sale		\$ 63.97	



Tracing formulas

- ▲ Check accuracy with tracer arrows
- ▲ Trace a cell or a formula
- ▲ Continue clicking Trace Precedents or Trace Dependents button to see all references

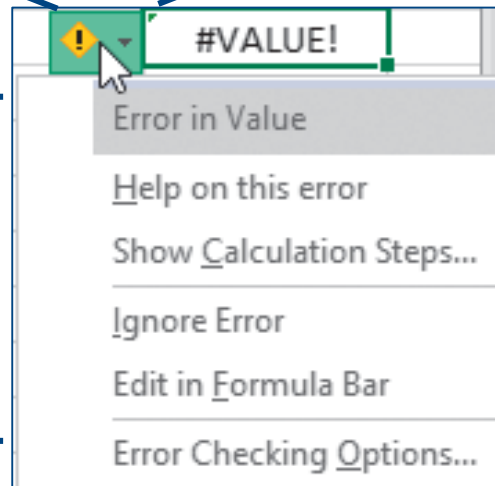
Checking for Errors

- Error Checking tool spots and corrects formula errors
- Indicated by a green indicator triangle in upper-left of cell

Warning sign displays after clicking cell with error

Green error indicator triangle

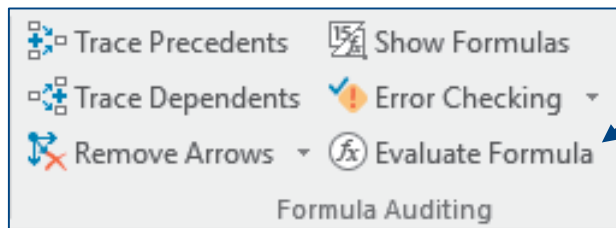
Warning sign options



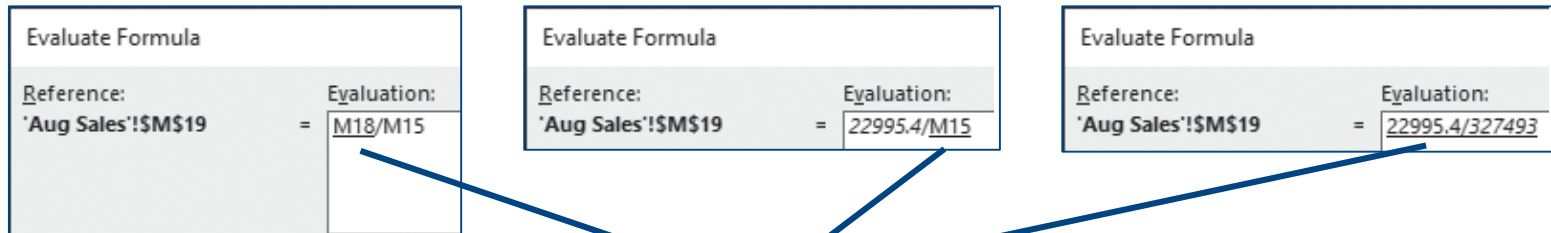
Checking for Errors (cont.)

■ Evaluate a formula

▲ Formula auditing tool



▲ Breaks down a formula into steps



Underlining indicates which step is being evaluated.

3-D Cell References

- Referring to data in a range of sheets instead of a cell in individual sheets is faster to create
 - ▲ Formula comparison:
=SUM(January!A5+February!A5+March!A5)
=SUM(January:March!A5)
- Data on new inserted sheets in the range automatically are included in formula

