#### BOOST YOUR SKILLS IN Microsoft Excel 365/2021

Chapter 9: Text Functions, Conditional Functions, and Formula Auditing

#### 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	В	С
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!

#### Extracting Text

- LEFT, MID, and RIGHT remove a specified number of characters.
- TRIM leaves only a single space between words.

	A	A B			
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?		

## Merge and Modify with Functions and Flash Fill

- CONCAT (previously CONCATENATE) combines two or more separate text entries into one cell.
- Flash Fill tool
  - Extracts one part of a cell only
  - Inserts text into a cell
  - Combines two names into one cell
  - Separates one name into two cells

C2	· · ·	: × •	f <sub>x</sub> =cond	ATENATE	A2," ",B2)
	А	В	С	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		



#### **Other Text Functions**

## There are many other text functions in Excel. The table below shows just a few of them:

	TEXT FUN	ICTIONS
Function	Description	Example
REPLACE	Replaces part of a text string with another text string, such as 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, such as 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, such as the letter A five times	Formula: =REPT("A",5) Result: AAAAA

### Creating Conditional Functions Using IF Criteria

- If a range of cells meets a stated criteria, you can apply a function to it.
- IF functions use one criterion; IFS functions 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)					

#### IF Criteria Function Arguments

# There are two required arguments for IF/IFS functions, Range and Criteria, as well as optional ones.

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/Average range	This is the range to be summed or averaged, which can be different from the range being compared with the criteria. For IF functions, the sum/average range is optional; if omitted, the range from the first argument is used. For IFS functions, the sum/average range comes first and is required.					

#### **Nested Functions**

#### You can create one function inside another function.

• Example: AVERAGE function nested inside a ROUND function



#### The IF Function

- This function returns the first value that is true
- A nested IF Function and IFS function provide the same result.

First	Last	Final Grade	Letter Grade
Sarah	Alamin	78	В
Ashley	Butler	83	Α
Curtis	Coverdale	92	Α
Yuel	Dolshi	75	В
Madison	Farrell	88	Α
Trevor	Fischer	83	Α
Nicolas	Gonzalez	67	С
Rohan	Kahar		F

In this example, these two formulas provide the same result:

=IF(C3>=80,"A",IF(C3>=70,"B",IF(C3>=60,"C",IF(C3>=50,"D","F"))))

=IFS(C3>=80,"A",C3>=70,"B",C3>=60, "C",C3>=50,"D",C3<50,"F")

#### **The SWITCH Function**

- This is a logical function that can simplify nested functions in some situations.
- It compares "an expression" to a list and returns the desired result for the matching value.

	Α	В	С	D	E	F	G	Н	1
Т	Del's Restaurant								
2			V	Veekly Ser	ver Sched	ule			
3									
4		Date	Feb 18	Feb 19	Feb 20	Feb 21	Feb 22	Feb 23	Feb 24
5		Weekday	М	Т	W	Th	F	Sa	Su
6	Name	Staff Needed	3	4	4	6	9	10	CLOSED

In this example, the SWITCH function evaluates the date in row 4 to return a short text entry in row 5 and the number of staff needed in row 6.

#### **Troubleshooting Formulas**

• The Trace Precedents and Trace Dependents auditing tools help identify cells used in a formula.

문 <sub>2</sub> Trace Precedents	$f_x$ Show Formulas
Trace Dependents	🙏 Error Checking 🛛 👻
👫 Remove Arrows 🗸	🕼 Evaluate Formula
Fo	rmula Auditing

• Trace Precedents works backwards 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			Ş	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	
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			

- Tracing your formulas
  - Check accuracy with tracer arrows.
  - Trace a cell or a formula.
  - Continue clicking the Trace Precedents or Trace Dependents button to see all references.

### **Checking for Errors**

- The Error Checking tool spots and corrects formula errors.
- Errors are indicated by a green indicator triangle in the upper-left corner of a cell.



#### Evaluate a Formula

This is an auditing tool that allows you to see a breakdown of how the formula was created to look for errors.



Underlining indicates which step is being evaluated.

#### **3-D Cell References**

- You can refer to data in multiple worksheets at the same time.
  - Compare the two formulas: =SUM(January!A5+February!A5+March!A5)
    =SUM(January:March!A5)
- The second one uses a 3-D cell reference!
- Data on new inserted sheets in the range are automatically included in the formula.