

# **Computer Applications Concepts**

## **Volume 4 - Functions - Office 2016**

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# Computer Applications Concepts

## Volume 4

### Functions – Office 2016 (and some earlier versions)

#### Introduction

This fourth volume of the *Computer Applications Concepts* series expands on a larger number of functions available for use in database and spreadsheet applications. We have again assumed that the user has a basic knowledge of computers, spreadsheets and database applications, and operating system environments.

To help you make the best of your spreadsheet and database programs, we have prepared the following information in a generic manner. This book has been entirely rewritten to use Office 2016 as the basis, but will still work with 2013, 2010 or 2007. This does not attempt to teach all the ins and outs of all functions, but rather to present capabilities that are commonly used and to give some in depth explanations of why some work the way they do. It will eventually take an additional book on advanced functions to examine some of the less familiar functions.

The book is broken up into related groups of functions, much as they are aligned in your application package lists (i.e. *Date & Time Functions*, *Financial Functions*, *Statistical Functions*, *Logical Functions*, *Math & Trigonometric Functions*, etc.).

The last segment of the book provides activities that require various capabilities covered in this volume. These fall short of "tests" since we felt that students needed to concentrate on actual functions and facilities covered and not get bogged down in building and formatting specific reports or document outputs.

The **Appendix** contains answer keys for the exercises in the book, and a **Solutions CD** is available for purchase with the actual spreadsheets and databases used in presenting the elements in this book, as well as the exercises.

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# Computer Applications Concepts

## Volume 4

### Functions – Office 2016

#### I. GENERAL INFORMATION

##### A. What is a Function?

1. Functions are merely canned formulas within a spreadsheet or database program. Functions enable rapid calculations and edits to large volumes of information with only a few knowledgeable strokes of the keyboard.
2. A large number of functions are available for use in spreadsheet and database application packages. A limited number are available for use in tables in Word Processing applications.

##### B. Uses of a Function

1. Spreadsheets are used to accomplish business and personal tasks, such as balancing a checkbook, analyzing statistical data, creating graphs and charts of data, selecting certain data to review, plus a myriad of other processes.
2. Databases are used for business and personal tasks as well, and these include applications where related tables are linked together so that data may be retrieved from multiple sources. Typical database applications include accounting functions for a business, as payroll, inventory, sales, invoicing, merging labels into documents, and many more.
3. Functions are used to garner information from a file more easily, perform calculations on numbers, project business trends based on data collected, and much, much more.
4. Functions can be used to do mathematical calculations or summation, averaging, and even trigonometric operations. In addition, they branch into the financial world to calculate payments, interest, and such.

#### II. FORMAT FOR A FUNCTION

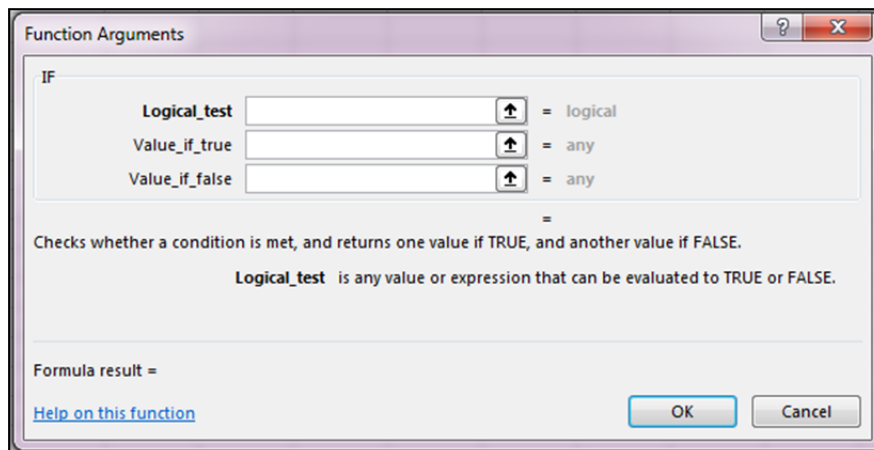
##### A. Function Format =FUNCTION(Argument 1, Argument 2...)

1. Generally, the *Function Name* is somewhat descriptive of its operation. Some *Function Names* differ from one application to another. For instance, the **IF** statement in Excel is **IIf** in Access; the **FIND** function in Excel is the **InStr** (In String) function in Access; and the **UPPER** function in Excel is **UCase** in Access. In addition, there are more of these.
2. When a function is "inserted" into a spreadsheet or database expression or when "Help" is consulted, the arguments are typically shown in the skeleton or template as descriptive placeholders identifying what they should represent. Arguments are separated with commas, and usually enclosed in parentheses.

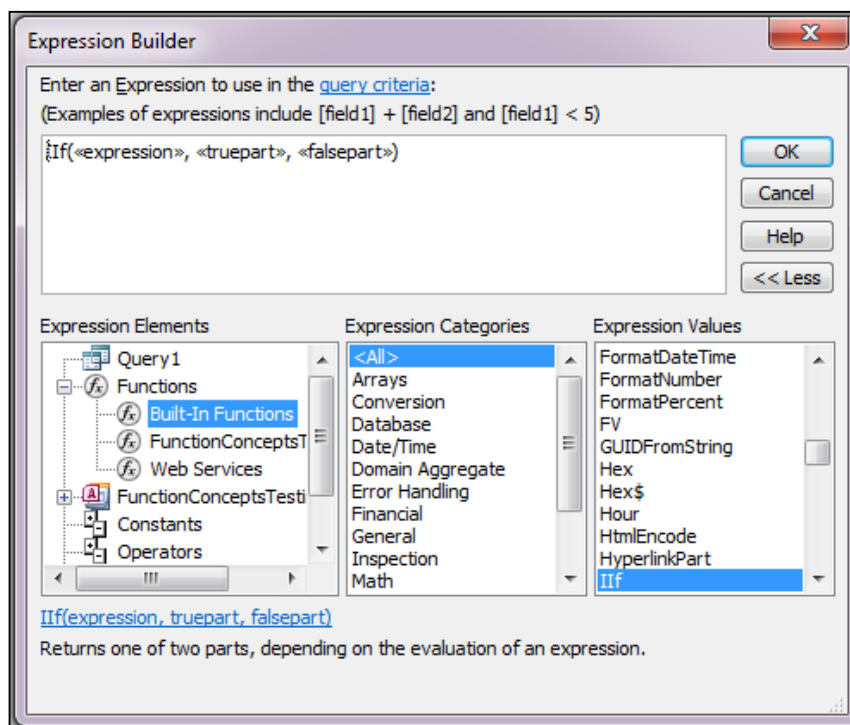
- a. If you type a function followed by a left parenthesis, as **=IF(** into a cell, you will see the following displayed. This allows one to add easily the parameters in the correct order for the function.

	A	B	C	D
1	=IF(			
2	IF(logical_test, [value_if_true], [value_if_false])			
3				

- b. Likewise, if you type a function into the formula bar followed by a left parenthesis, the same skeleton will appear to guide you in entering parameters. In addition, if you click on the **fx** icon next to the formula bar, the *Functions Arguments* box will appear that shows a more detailed explanation of what each argument is asking for.



- c. Anytime you view a formula in the formula bar and click after the left parenthesis following a formula, it will show the skeleton of the formula that you have clicked in, and it will show colors for the parameters of the entire formula and outline the cells referred to in the same color. This is handy when you need to correct a problem.
- d. In Access, you can view a skeleton of a formula if you use the Expression Builder and select a function by displaying Functions, then Built-In Functions and selecting a function from the right column in the window. Clicking on one of the parameters selects the parameter, and you can replace the parameter with correct information by typing it in or pasting the data from a selection in the window below the expression box.



- 3. Arguments or parameters for functions may be a cell reference, actual text or data, a number, or a *range* that identifies a group of contiguous cells.

10. Open your **Functions – 2016** database in Access and add a new table in Design View named **Asset** with the following fields and specifications.

Field Name	Data Type	
ID	AutoNumber	
Asset	Short Text	15 characters
Date of Purchase	Date/Time	Short date
Cost	Number	Double, standard, 2 decimals
SLNRemaining	Number	Double, standard, 2 decimals
DDBRemaining	Number	Double, standard, 2 decimals
SYDRemaining	Number	Double, standard, 2 decimals

- a. Enter the following data.

ID	Asset	Date of Purchase	Cost	SLNRemaining	DDBRemaining	SYDRemaining
1	Computer	1/1/2014	2,375.00	2,375.00	2,375.00	2,375.00

- b. Note that the **Cost** is initialized as the beginning value in the **Remaining** fields.

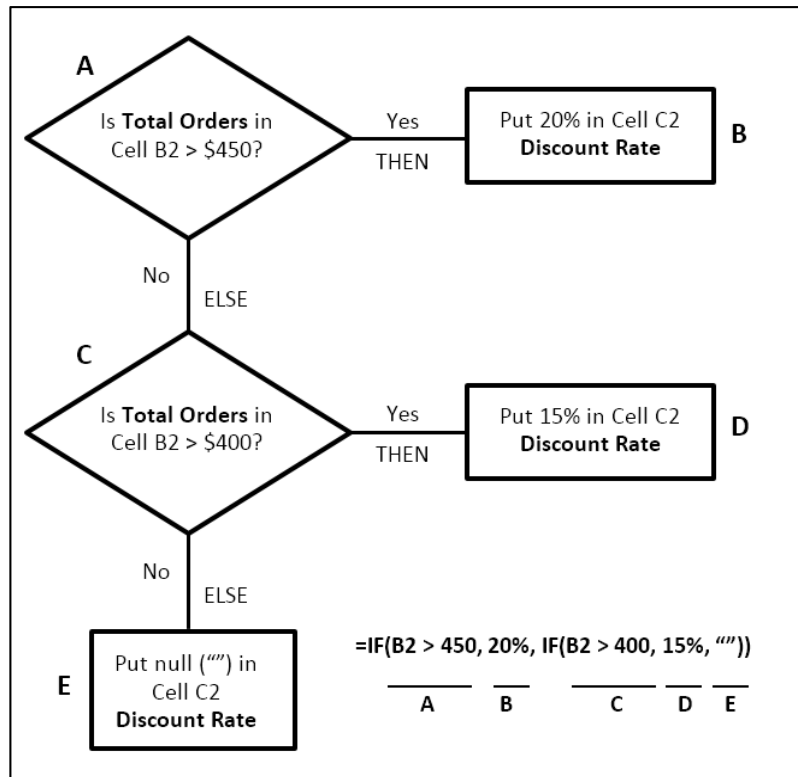
11. Add another table in the **Functions - 2016** database in Access in Design View named **Depreciation** with the following fields and specifications.

Field Name	Data Type	
ID	AutoNumber	
Asset	Number	
Year Depr	Number	
SLN Depr	Number	Double, standard, 2 decimals
DDB Depr	Number	Double, standard, 2 decimals
SYD Depr	Number	Double, standard, 2 decimals
Posted Depr	Yes/No	Default value No

- a. For the **Asset** field pull down the Data Type Menu, select the **Lookup Wizard** and specify to look up the data from the **Asset** table in the **Asset** field. There will only be one option, use it.
- b. For **Year Depr** use 2014.
- c. Save the table and close it.
12. Create an Update Query named **UpdDepr** in the Design View (ALT, C, QD) to update the following fields.
- a. **SLN Depr** in the **Depreciation** table should be updated with the **SLN** function with these specifications.
- (1) *Cost* is the **Cost** from the **Asset** table.
  - (2) *Salvage* is the **Cost** from the **Asset** table times .05 for 5% of the cost being the salvage.
  - (3) *Life* is 5.
  - (4) Run the query to be sure it works and the result matches the result from Excel (451.25).



- d. In other words, IF the **Total Orders** (Cell B2) is greater than 450 THEN **Discount** (Cell C2) is 20%, ELSE, IF the **Total Orders** (Cell B2) is greater than 400, THEN the **Discount Rate** (Cell C2) is 15%, ELSE, the **Discount Rate** (Cell C2) is a null ("") character.



- e. Again, the first decision block has a *TRUE* and *FALSE* side specified by *Yes* and *No*. The first question in a *Logical\_Test* diamond is "Is **Total Orders** in Cell B2 greater than 450?"
- (1) If the answer is *Yes*, then go to the block to the right. The **Discount Rate** in Cell C2 will be 20%.
  - (2) If the answer is *No*, then follow the "No" branch below the *Logical\_Test* diamond.
    - (a) We are creating another *IF* statement for the *Value\_If\_False*.
    - (b) This decision block holds the question, "Is **Total Orders** in Cell B2 greater than 400?"
    - (c) If the answer is *Yes*, then follow the "Yes" branch which should always go to the right. The **Discount Rate** in Cell C2 will be 15%.
    - (d) If the answer is *No*, the **Discount Rate** in Cell C2 will be a null character.
  - (3) Looking at the chart above, the first *IF* statement has its decision block marked as **A**.
    - (a) *Value\_If\_True* is the box marked as **B**.
    - (b) The *Value\_If\_False* is marked as **C** and this is the decision block for the **embedded IF**.
      - i) The *Value\_If\_True* is the box marked as **D**.
      - ii) The *Value\_If\_False* is marked as **E**.
  - (4) Note that the formula printed shows each segment related to a block on the chart marked **A thru E**.
- f. Replace the formula in Cell C2 with this **embedded IF** statement and fill down.

4. Use the following functions in the cells in Row 2.
  - a. Use **INT** in Cell B2 with Cell A2 as the argument.
  - b. Use **TRUNC** in Cell C2 with Cell A2 as the argument.
  - c. Use **TRUNC** in Cell D2 with Cell A2 as the first parameter and 2 as the second parameter.
  - d. Use **TRUNC** in Cell E2 with Cell A2 as the first parameter and -1 as the second parameter.
  - e. Use **TRUNC** in Cell F2 with Cell A2 as the first parameter and -3 as the second parameter.
  - f. Use **ROUND** in Cell G2 with Cell A2 as the first parameter and 0 as the second parameter.
  - g. Fill all columns down thru Row 19.
  - h. Format Columns B, C, and G with no decimal places.
  - i. Note the results.

	A	B	C	D	E	F	G
1	Number	Int	Trunc	Trunc-2	Trunc-3	Trunc-4	Round
2	8,888.888	8,888	8,888	8,888.880	8,880.000	8,000.000	8,889
3	777.777	777	777	777.770	770.000	0.000	778
4	666.666	666	666	666.660	660.000	0.000	667
5	55.555	55	55	55.550	50.000	0.000	56
6	44.444	44	44	44.440	40.000	0.000	44
7	33.333	33	33	33.330	30.000	0.000	33
8	2.222	2	2	2.220	0.000	0.000	2
9	1.111	1	1	1.110	0.000	0.000	1
10	0.111	0	0	0.110	0.000	0.000	0
11	0.777	0	0	0.770	0.000	0.000	1
12	-1.111	-2	-1	-1.110	0.000	0.000	-1
13	-2.222	-3	-2	-2.220	0.000	0.000	-2
14	-3.333	-4	-3	-3.330	0.000	0.000	-3
15	-44.444	-45	-44	-44.440	-40.000	0.000	-44
16	-55.555	-56	-55	-55.550	-50.000	0.000	-56
17	-666.666	-667	-666	-666.660	-660.000	0.000	-667
18	-777.777	-778	-777	-777.770	-770.000	0.000	-778
19	-8,888.888	-8,889	-8,888	-8,888.880	-8,880.000	-8,000.000	-8,889

- (1) The difference between the **INT** and **TRUNC** functions can be seen in Cells B12 and C12. The **INT** function rounds DOWN to the next lower integer. The **TRUNC** function simply lops off the number of positions or turns the positions into zeroes.
- (2) Note Column D where the **TRUNC** function was to truncate one position. It simply turned the position to zero without rounding.
- (3) When the **TRUNC** function was set to a negative number (-1) in Column E, it turned one position to the left of the decimal to zero without rounding.

- e. The primary reason to use *radians* in lieu of *degrees* in trigonometry is that when one knows the angle and the radius, one can determine the length of the arc cut in the circle by multiplying the angle in *radians* times the radius.
- f. Excel has a **DEGREE** and a **RADIAN** function that Access lacks, and these are used for translating from degrees to radians or vice versa.
  - (1) However, if you know *degrees*, you can multiply by  $\pi$  divided by 180 to get *radians*.  

$$\text{Radian} = \text{Degree} * \text{PI}() / 180$$
  - (2) To convert *radians* to *degrees*, multiply by 180 divided by  $\pi$  (or the **PI()** function.)  

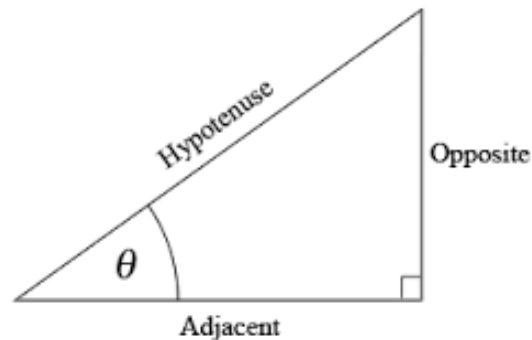
$$\text{Degree} = \text{Radian} * 180 / \text{PI}()$$

## 2. SIN Function

**=SIN(Number)** in Excel

**Sin(Number)** in Access

- a. The **SIN** function returns the *sine* of  $\theta$  when  $\theta$  is an angle measured in *radians*. The *sine* in a right triangle is the ratio of the length of the side opposite an acute angle to the length of the hypotenuse.
- b. 
$$\text{Sin}(\theta) = \frac{\text{Opposite Side}}{\text{Hypotenuse}}$$



## 3. COSINE Function

**=COS(Number)** in Excel

**Cos(Number)** in Access

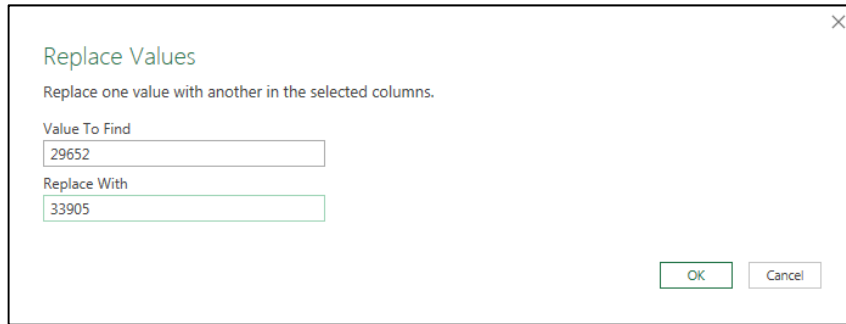
- a. The **COS** function returns the *cosine* of  $\theta$  when  $\theta$  is an angle measured in *radians*. The *cosine* in a right triangle is the ratio of the length of the adjacent side of an acute angle to the length of the hypotenuse.
- b. 
$$\text{Cos}(\theta) = \frac{\text{Adjacent Side}}{\text{Hypotenuse}}$$

## 4. TANGENT Function

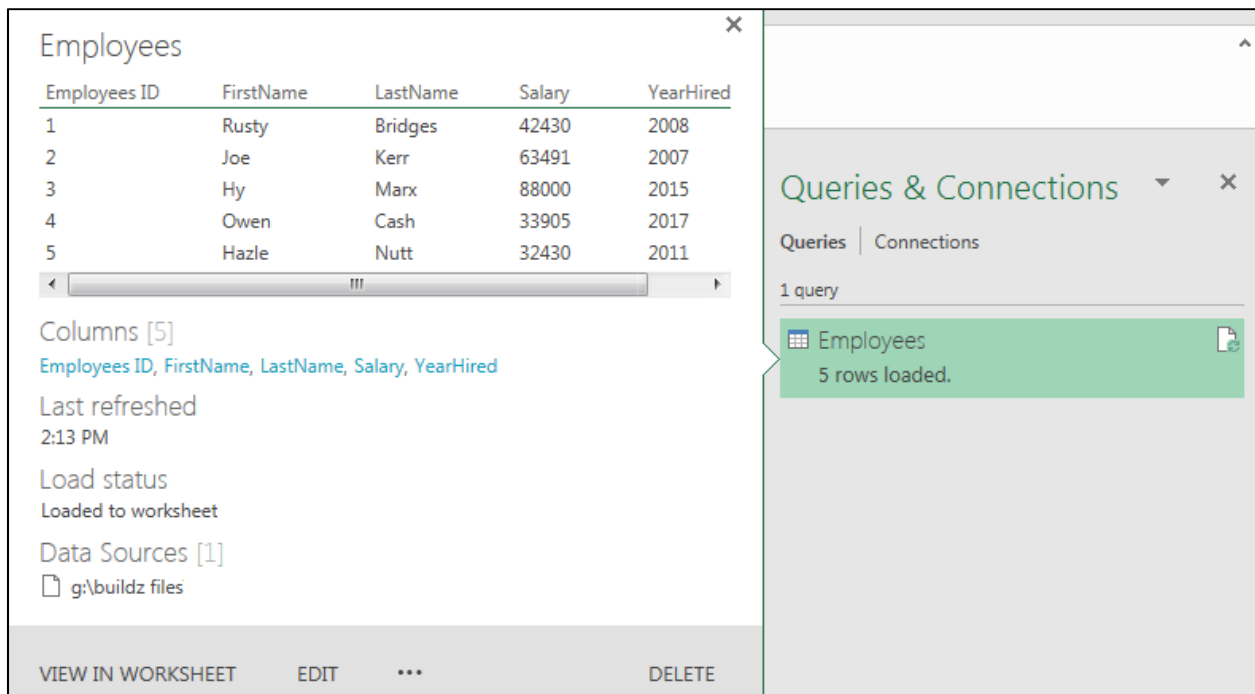
**=TAN(Number)** in Excel

**Tan(Number)** in Access

- a. The **TAN** function returns the *tangent* of  $\theta$  when  $\theta$  is an angle measured in *radians*. The *tangent* in a right triangle is the ratio of the side opposite to the side adjacent to an acute angle of a right triangle. If the angle is expressed in degrees, it must be multiplied by **PI() / 180** to convert it to *radians*.
- b. 
$$\text{Tan}(\theta) = \frac{\text{Opposite Side}}{\text{Adjacent Side}}$$



- I. Select the Home tab and click the Close & Load icon located in the upper left-hand corner.
- J. Your table is uploaded into Excel. Name the spreadsheet **Employees**. If you need to edit the query, click the data tab and select Queries & Connections. A task pane will appear on the right-hand side. Hover your cursor over the Employees query and a pop-up window allows you to preview the data.



- K. Right-clicking the query provides you with options to modify your data. Click Duplicate. The Query Editor opens with your new query named Employees (2).
- L. Select the Salary column and click Remove Columns. Click Close & Load.
- M. Name your new worksheet Employees 2. This data is changed without altering your original data. This would be useful for narrowing down larger amounts of data.
- N. Having separate queries allows you to analyze a specific piece of data without looking at the entire picture. From here you can merge, append, and even group your queries to make the data more accessible. Take a moment to explore other capabilities in the Query Editor.

(3) The **Results** are a more readable series of data.

	A	B	C
1	<b>CONCATENATION</b>	<b>OF TEXT</b>	<b>RESULT</b>
2	Quarterback	Team	Quarterback of Team
3	Favre	Green Bay	Favre of Green Bay
4	Aikman	Dallas	Aikman of Dallas
5	Brown	New York	Brown of New York

5. Concatenating Cells with Numbers in them.

- a. Cells or fields that are defined as numeric fields are automatically converted from number formats to text format when concatenation occurs.
- b. On the same **CONCATENATE** worksheet, enter the following information in appropriate cells.
- c. In Cell F1, enter the label **RESULT**.
- d. Insert the appropriate concatenation function in Cell F2 to concatenate Cell D2 and E2 with a hyphen between the cells and fill down thru Cell F5.

	D	E
1	<b>CONCATENATION</b>	<b>OF NUMBERS</b>
2	Zip	4
3	75005	2720
4	78024	1990
5	90210	5638

(1) The function should have the following appearance below:

**=CONCATENATE(D2, "-", E2)**

(2) The result of this concatenation is as follows.

	D	E	F
1	<b>CONCATENATION</b>	<b>OF NUMBERS</b>	<b>RESULT</b>
2	Zip	4	Zip-4
3	75005	2720	75005-2720
4	78024	1990	78024-1990
5	90210	5638	90210-5638

## B. EXACT Function

**=EXACT(Text1, Text2) in Excel only**

1. The **EXACT** function compares two strings of text or characters and returns 1 or *TRUE* if they are exactly the same, or it returns 0 or *FALSE* if they are not.
  - a. The **EXACT** function is case-sensitive (for example, it differentiates between "Hello" and "hello"), but it ignores formatting differences (for example, it does not differentiate between "Hello" and "Hello".)
  - b. You can use the **EXACT** function to confirm that entries have been typed correctly.
  - c. For example, if you have a list of the same names in two separate places in your spreadsheet, and you want to make sure that the names in the two lists are spelled the same, you can use the **EXACT** function.
2. *Text1* and *Text2* are references to cells that contain text. If you type two strings in the formula, they should each be enclosed in double quotation marks (").

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