



# Become an Expert on Excel Lookup Functions

*Patricia McCarthy*

*Course # 2164583, Version 2007, 5 CPE Credits*

**your self-study.**  
**your way.**

## Course CPE Information

### Course Expiration Date

Per AICPA and NASBA Standards (S9-06), QAS Self-Study courses must include an expiration date that is *no longer than one year from the date of purchase or enrollment*.

### Field of Study

Computer Software & Applications. Some state boards may count credits under different categories—check with your state board for more information.

### Course Level

Intermediate.

### Prerequisites

Familiarity with Excel and how to use basic functions such as SUM and COUNT. Assumes the user understands what an absolute cell reference is.

### Advance Preparation

This course is written for Excel 365 subscribers but users with Excel 2010 or higher should have little difficulty.

### Course Description

This course provides a comprehensive examination of the Lookup and Reference category in Excel. It covers the LOOKUP and VLOOKUP functions.

With VLOOKUP, you will learn how to: use Wildcards; search through multiple sheets for a match; and what to do if a match is not in the first column of your table.

The course also explores HLOOKUP. It explains the advantages and disadvantages of INDEX MATCH versus VLOOKUP. The section ends with a brief overview of XLOOKUP() which is still in Beta as of September 2019.

It reviews the OFFSET function, which allows you to write calculations that automatically update as new data is added. With the INDIRECT function, you will learn how to find data on other worksheets. Finally, HYPERLINK is briefly discussed since it is in the lookup and reference section.

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## **Instructional Design**

This Self-Study course is designed to lead you through a learning process using instructional methods that will help you achieve the stated learning objectives. You will be provided with course objectives and presented with comprehensive information and facts demonstrated in exhibits and/or case studies. Review questions will allow you to check your understanding of the material, and a qualified assessment will test your mastery of the course.

Please familiarize yourself with the following instructional features to ensure your success in achieving the learning objectives.

### **Course CPE Information**

The preceding section, “Course CPE Information,” details important information regarding CPE. If you skipped over that section, please go back and review the information now to ensure you are prepared to complete this course successfully.

### **Table of Contents**

The table of contents allows you to quickly navigate to specific sections of the course.

### **Learning Objectives and Content**

Learning objectives clearly define the knowledge, skills, or abilities you will gain by completing the course. Throughout the course content, you will find various instructional methods to help you achieve the learning objectives, such as examples, case studies, charts, diagrams, and explanations. Please pay special attention to these instructional methods, as they will help you achieve the stated learning objectives.

### **Review Questions**

The review questions accompanying this course are designed to assist you in achieving the course learning objectives. The review section is not graded; do not submit it in place of your qualified assessment. While completing the review questions, it may be helpful to study any unfamiliar terms in the glossary in addition to course content. After completing the review questions, proceed to the review question answers and rationales.

### **Review Question Answers and Rationales**

Review question answer choices are accompanied by unique, logical reasoning (rationales) as to why an answer is correct or incorrect. Evaluative feedback to incorrect responses and reinforcement feedback to correct responses are both provided.

### **Glossary**

The glossary defines key terms. Please review the definition of any words you are not familiar with.

### **Index**

The index allows you to quickly locate key terms or concepts as you progress through the instructional material.

## Qualified Assessment

Qualified assessments measure (1) the extent to which the learning objectives have been met and (2) that you have gained the knowledge, skills, or abilities clearly defined by the learning objectives for each section of the course. Unless otherwise noted, you are required to earn a minimum score of 70% to pass a course. If you do not pass on your first attempt, please review the learning objectives, instructional materials, and review questions and answers before attempting to retake the qualified assessment to ensure all learning objectives have been successfully completed.

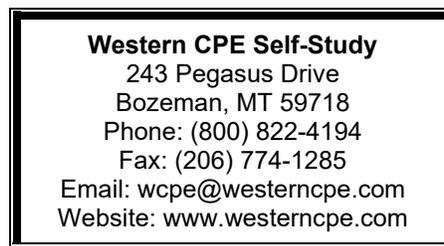
## Answer Sheet

Feel free to fill the Answer Sheet out as you go over the course. To enter your answers online, follow these steps:

1. Go to [www.westerncpe.com](http://www.westerncpe.com).
2. Log in with your username and password.
3. At the top right side of your screen, hover over “My Account” and click “My CPE.”
4. Click on the big orange button that says “View All Courses.”
5. Click on the appropriate course title.
6. Click on the blue wording that says “Qualified Assessment.”
7. Click on “Attempt assessment now.”

## Evaluation

Upon successful completion of your online assessment, we ask that you complete an online course evaluation. Your feedback is a vital component in our future course development.



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## **Become an Expert on Excel Lookup Functions**

### **Learning Objectives**

After completing this section of the course, you will be able to:

- Recognize the syntax, location, characteristics, and use of the functions LOOKUP, VLOOKUP, CHOOSE, and HLOOKUP in Excel
- Recognize the usage and location of the data validation feature
- Recognize the characteristics, treatment, and creation of range names in Excel
- Recognize the syntax and usage of wildcards and other functions such as COLUMN, ROW, IFERROR, ISERROR in a VLOOKUP function
- Recognize the syntax and characteristics of an INDEX MATCH function
- Recognize the syntax and use of OFFSET to create dynamically updated data
- Use the INDIRECT function to retrieve information
- Recognize the syntax and application of other Lookup and Reference functions such as COUNT and HYPERLINK

### **Overview of LOOKUP Functions**

*The various Lookup functions are invaluable. Because I use them so often, they are my favorite set of functions.*

The basic premise of a lookup function is simple. Use a lookup function if you have data in different sheets or files, that you need to refer to. For example, suppose you have an order entry form similar to the screenshot below, but you also need to know the name of the actual product. You have two options: you can memorize all the Product IDs and all their associated Product Names, or you can create a lookup table, and have Excel match and then retrieve the Product Name associated with the Product ID. I think we both know which method is most efficient.

	A	B	C	D	E	F
1	Order Entry Information					
2	Salesperson	State	Customer	Requested Ship	Product ID	Product Name
3	Brown	RI	Williams Gardens	4/20/2013	BG-CF-23	
4	Daniels	OH	Buckeye Gardens	10/25/2013	BH-SV-67	
5	Daniels	IN	Pence Landscaping	3/10/2013	BO-PF-45	
6	Adams	MA	Walden Nursery	4/2/2014	CE-DB-BH	

The lookup functions do exactly what you would do but quicker and with less stress. Below is a **Lookup** table containing the information I am looking for.

Since there is not a lot of data here you can easily tell that Williams Gardens (in the screen shot above) bought Product ID **BG-CF-23** which is a Bing Cherry Tree. How did you figure it out? You probably looked at the contents of Cell **E3** and then looked at the screenshot below to find a match. You found the matching column called Product ID and then looked across to find Product Name and at the *intersection point* was the information you needed – Bing Cherry Tree.

	J	K	L	M	N	O	P	Q
1	Look Up Table							
2	Product ID	Category	Product Line	Type	Product Name	Size	Price	
3	BA-PF-45	Tree	Fruit	Pear	Bartlett Pear	4-5Ft	\$ 16.95	
4	BA-PF-67	Tree	Fruit	Pear	Bartlett Pear	6-7 Ft	\$ 39.95	
5	BA-PF-89	Tree	Fruit	Pear	Bartlett Pear	8-9 Ft	\$ 64.95	
6	BG-CF-23	Tree	Fruit	Cherry	Bing Cherry	4-5 Ft	\$ 17.95	
7	BH-SV-45	Tree	Ornamental	Birch	Silver Birch	4-5Ft	\$ 24.95	

Excel matches and retrieves the information in the same way, although it offers several different lookup functions depending upon how your data is set up.

## LOOKUP Function

**VLOOKUP** seems to be the most commonly used Lookup function, but first let's examine the **LOOKUP** function, as it will help you understand **VLOOKUP** and other lookup functions.

**LOOKUP** is the original Lookup function. It is also the simplest. However, many people have stopped using it because it is so simple. Since many of the other Excel Lookup functions are based on it, we are going to take a look at it before discussing the more popular Lookup functions.

The Excel **LOOKUP** function has two forms: the **Vector Form** and the **Array Form**. First, we are going to review the **Vector Form**, which allows us to lookup a single value from a column. Next, we will review the **Array Form**. The **LOOKUP** function is very straightforward, although you would never know it from its syntax.

**=LOOKUP(Lookup\_Value), lookup\_vector, result\_vector)**



In English, this syntax translates as:

=LOOKUP(value you are looking up, column that contains the value you are looking up, the column that contains the answer).

	A	B	C	D
1				
2				
3	Employee	Salary	Commission Rate	Bonus
4	Adams	\$ 300,000	20%	\$ 15,000
5	Hamilton	\$ 485,000	25%	\$ 25,000
6	Madison	\$ 147,000	15%	\$ 10,000
7	Paine	\$ 73,000	10%	\$ 3,000
8	Pitcher	\$ 23,000	0%	\$ 5,000
9	Shays	\$ 18,000	0%	\$ 5,000

In the screenshot above, we have an Employee Payroll listing, and I want to find Hamilton's salary. So, we need to look up **Hamilton**, which is in Column **A**; that takes care of the first 2 parts of the syntax – the lookup value is **A5** or "Hamilton" and the lookup vector is in **Column A**.

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Quotations have been placed around Hamilton to tell Excel that Hamilton is text.

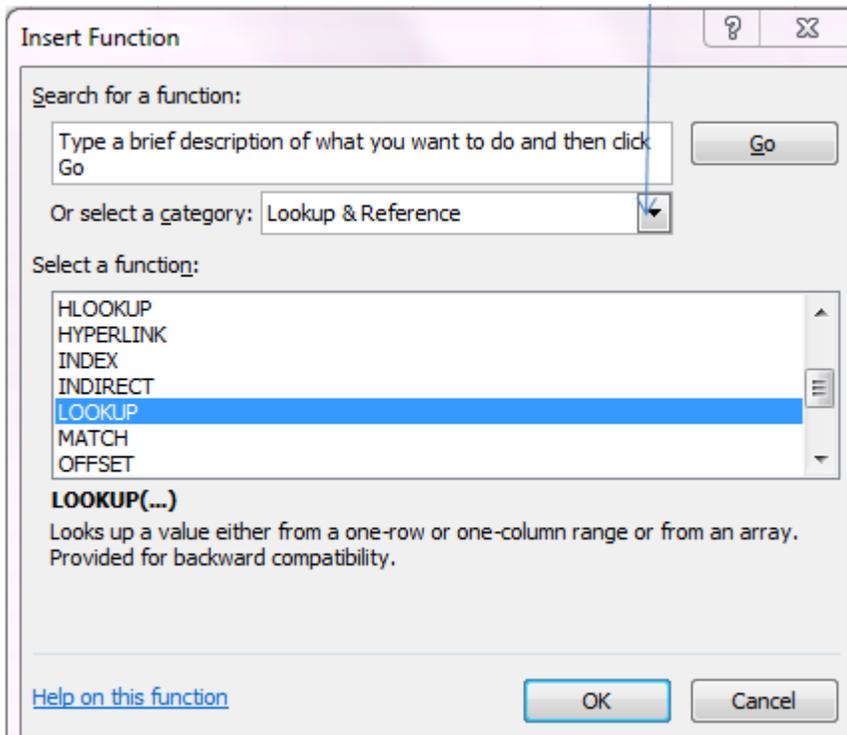
We are looking up Hamilton's salary, so the *Result Vector*, or answer I am looking for, is the range in Column B – Salary. The equation is: =LOOKUP("Hamilton",A4:A9,B4:B9) or =LOOKUP(A5,A4:A9,B4:B9).

This looks simplistic because there are only 6 rows of information, but you would find it convenient if you had a hundred or a thousand employees, and were sorting and scrolling to find a specific employee.

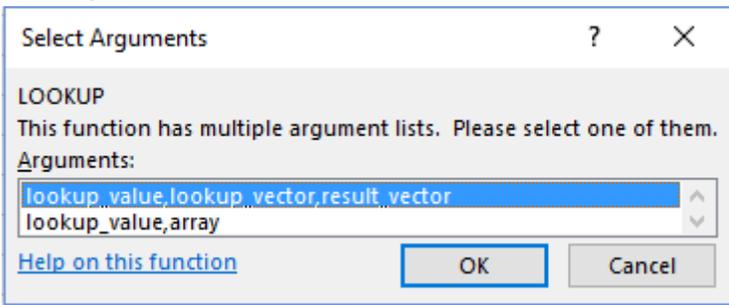
### LET'S TRY IT!

Let's go through the steps to find Hamilton's salary.

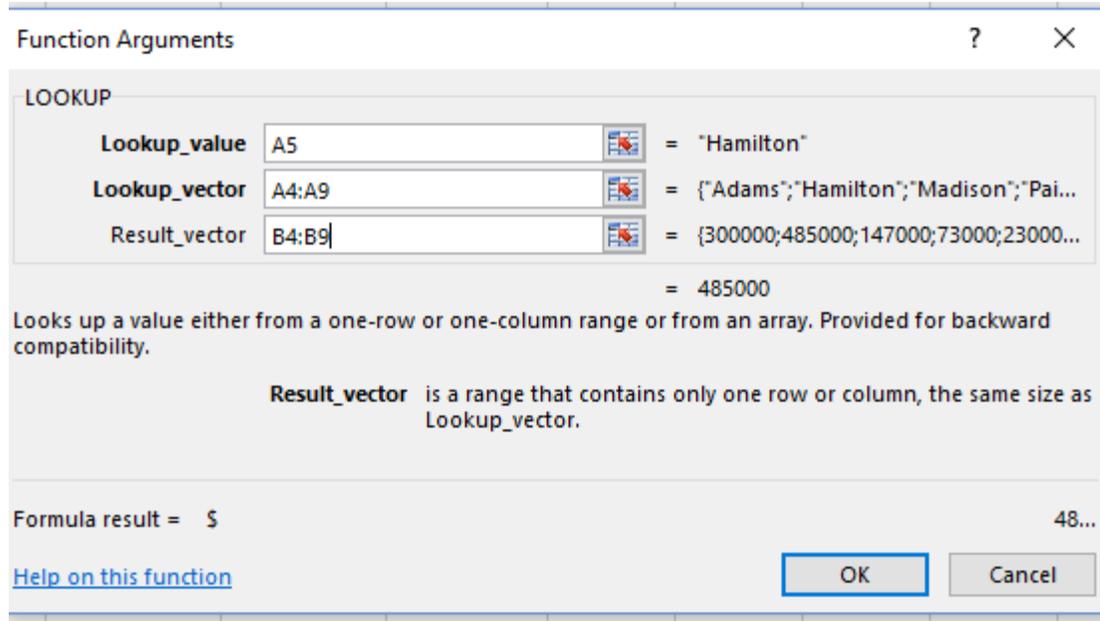
1. Open the Excel file named LOOKUP.xlsx.
2. Click on Lookup\_Example Sheet if necessary.
3. Click in cell **F1**. This is where we want the answer to appear.
4. Click on the  button on the formula bar.
5. Select **Lookup & Reference** from the Select a *Category*: drop box.



6. Scroll down (functions are in alphabetical order) and select **LOOKUP**.
7. Click **OK**.



8. The default, which is the vector form should be selected. Click **OK**.
9. Enter the information as shown in the screenshot below:



- The Lookup\_value is **A5** which is where the Employee name Hamilton is located.
- The Lookup\_vector of **A4:A9** is the range of Employee names.
- The Result\_vector to find the correct salary is **B4:B9**.

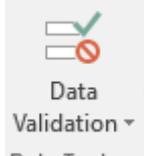
10. Click **OK**.

➤ If you typed the name Hamilton in the Lookup\_value, instead of A5, make sure Hamilton is enclosed in quotation marks. In Excel, text must be enclosed in quotation marks.

If you have any questions or problems, please consult the the next sheet in the file named Lookup\_Example\_answer.

I don't want to type the employee name each time I search for a salary. If I had replaced "Hamilton" with A5 in the equation, I might as well have done it manually, as I would have to search for Hamilton to find him, and at that point I could just look across and see his salary. Consequently, it would be more efficient if I combined this function with the Data Validation feature. Combining them would allow the employee name to be selected from a list, so you would not have to type it in every time. Let's incorporate a Data Validation into this example.

## Data Validation



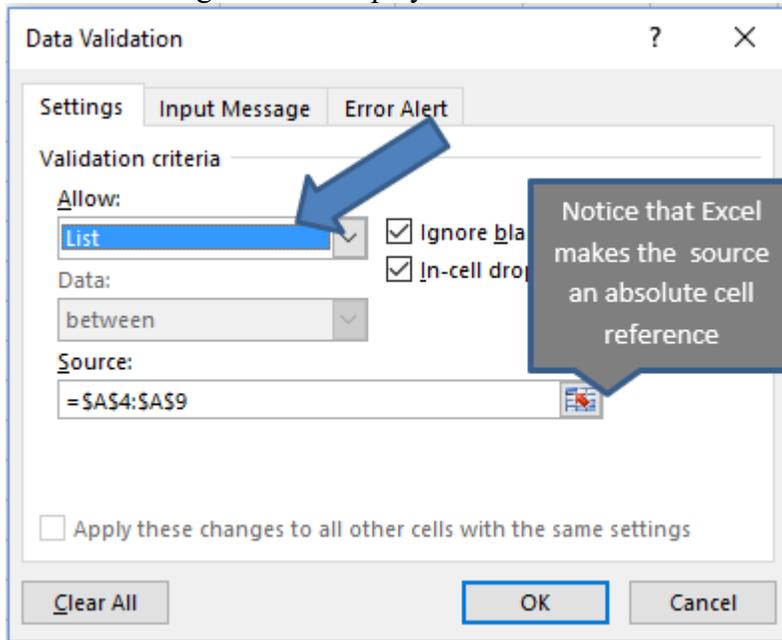
There are a variety of options within data validation, but we are going to focus on drop-down lists. To create a data validation list, go to the **Data** tab, select the **Data Validation** icon and then select **List**. Within the range, you select the data you want to display.

### LET'S TRY IT!

Let's incorporate a Data Validation drop down list of employee names, and create a Lookup function to find an employee's bonus.

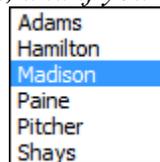
1. Click on the sheet called Lookup\_Validation.
2. Click on cell G1.
3. Click on the **Data** Tab.
4. Click on the **Data Validation** icon from the *Data Tools* group.

A dialog box will display.



5. Select **List** from *Allow*:
6. Select the range or type **\$A\$4:\$A\$9** as the *Source*.
7. Click **OK**.

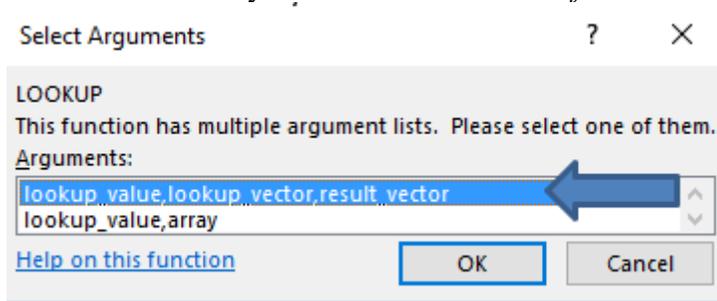
You should see that cell G1 now has a little drop down beside it, and if you click on the drop-



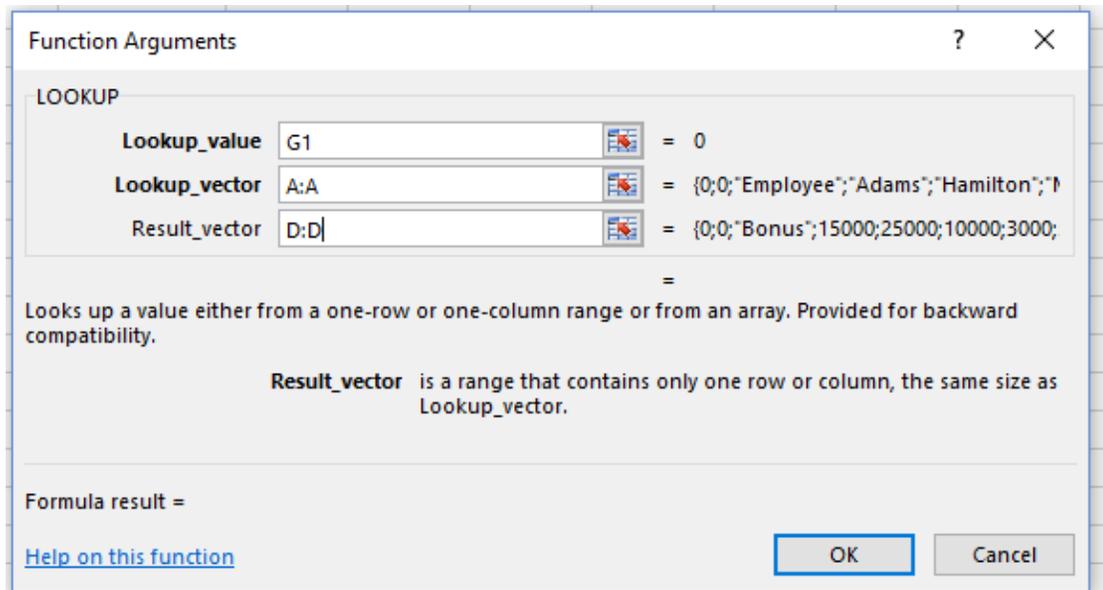
down arrow, all the employee names in Column A will display.

Okay – now let's do the Lookup function, but we will reference cell G1 as the lookup value instead of A5.

8. Click in Cell **G2**. This is where we want the answer to display.
9. Click on the  button on the formula bar.
10. Select *Lookup & Reference* from the *Category* drop box.
11. Select **LOOKUP**.
12. Select the default syntax which is the *vector form*.



13. Click **OK**.
14. Enter the information shown in the screenshot below:



- The `Lookup_value` is **G1**.
- The `Lookup_vector` is **A:A** – the employee column.
- the `Result_vector` is **D:D** – the bonus column.

I selected the entire column, as I am assuming we have a lot of employees. However, instead you could have selected a specific range such as A4:A9,B4:B9.

Sometimes, selecting an entire column is unnecessary, and it uses more computer resources. *If you have many large and complex worksheets, then selecting an entire column would not be recommended.*

If you don't have an answer or if you see #N/A– don't panic.

F	G
Employee Name	
Bonus	#N/A

15. Click on the drop-down arrow at cell **G1**, select an employee name, and you should see the corresponding bonus.

	A	B	C	D	E	F	G
1						Employee Name	Pitcher
2						Bonus	5000
3			Commission				
	Employee Salary		Rate	Bonus			
4	Adams	\$ 300,000	20%	\$ 15,000			
5	Hamilton	\$ 485,000	25%	\$ 25,000			
6	Madison	\$ 147,000	15%	\$ 10,000			
7	Paine	\$ 73,000	10%	\$ 3,000			
8	Pitcher	\$ 23,000	0%	\$ 5,000			
9	Shays	\$ 18,000	0%	\$ 5,000			

16. Select another employee from the drop-down list and the bonus changes based upon whatever new name is displayed in cell G1.

➤ **Warning:** If the employee data is not sorted in alphabetical (A-Z) order, you may not get the correct answer. It is always a good idea to check the answer for the second or third lookup value, to confirm your calculation and sorting are correct.

In the screenshot below, I re-sorted employee names Z to A, and now Molly Pitcher is one happy lady as she is receiving Adams' bonus!

	A	B	C	D	E	F	G
1						Employee Name	Pitcher
2						Bonus	15000
3			Commission				
	Employee Salary		Rate	Bonus			
4	Shays	\$ 18,000	0%	\$ 5,000			
5	Pitcher	\$ 23,000	0%	\$ 5,000			
6	Paine	\$ 73,000	10%	\$ 3,000			
7	Madison	\$ 147,000	15%	\$ 10,000			
8	Hamilton	\$ 485,000	25%	\$ 25,000			
9	Adams	\$ 300,000	20%	\$ 15,000			

➤ Whatever you are looking up, must be in A-Z order, or your answer may be incorrect. The **VLOOKUP** and **HLOOKUP** functions also assume that your lookup value column is in alphabetical order. (Note: there is a workaround that will be discussed later.)

Now, let's use the **Array Form**. The array version is similar to the **VLOOKUP**, as it allows us to look up values based upon a table of data. A table of data can be on the same sheet, the same

file, or a different file. An array is a block of contiguous cells. We are going to use the previous Excel data to make it easier to follow. I already created the data validation for us.

The syntax is **Lookup(lookup\_value,array)**.

In the screenshot below I looked up Pitcher’s bonus by writing the equation **=LOOKUP(G1,A:D)**.

Now, it really doesn’t look that different from what we did a few minutes ago, **=LOOKUP(G1,A:A,D:D)** does it? It is the same information written slightly differently. We now have two pieces of data instead of three.

If you look at the next sheet in the file, labeled Lookup\_array answer, you will see there are a number of formula variations that will work.

	A	B	C	D	E	F	G
1						Employee Name	Pitcher
2						Bonus	5000
3	Employee	Salary	Commission Rate	Bonus			
4	Adams	\$ 300,000	20%	\$ 15,000			
5	Hamilton	\$ 485,000	25%	\$ 25,000			
6	Madison	\$ 147,000	15%	\$ 10,000			
7	Paine	\$ 73,000	10%	\$ 3,000			
8	Pitcher	\$ 23,000	0%	\$ 5,000			
9	Shays	\$ 18,000	0%	\$ 5,000			

Here is where the big difference comes into play. The **LOOKUP** in *Vector Form*, which we used in the first exercise, can only search in one column, so we could not have looked up the Employee’s Bonus, too. With the **LOOKUP Array Form** you can search in more than one column. Note what the last column in the formula is. This is the location from which Excel will retrieve the information. In the screenshot below, I replaced the array A4:B9 with A4:D9, so the lookup understood that column **D** was the end of the range, and that is where the answer is located. Pretty slick eh?

The screenshot shows an Excel spreadsheet with the following data table:

	A	B	C	D	E	F	G	H
1						Employee Name	Pitcher	
2						Bonus	=LOOKUP(G1,A4:D9)	
3	Employee	Salary	Commission Rate	Bonus				
4	Adams	\$ 300,000	20%	\$ 15,000				
5	Hamilton	\$ 485,000	25%	\$ 25,000				
6	Madison	\$ 147,000	15%	\$ 10,000				
7	Paine	\$ 73,000	10%	\$ 3,000				
8	Pitcher	\$ 23,000	0%	\$ 5,000				
9	Shays	\$ 18,000	0%	\$ 5,000				

The 'Function Arguments' dialog box for the LOOKUP function is open, showing the following details:

- LOOKUP** function arguments:
  - Lookup\_value:** G1 = "Pitcher"
  - Array:** A4:D9 = {"Adams",300000,0.2,15000;"Hamilit..."}
- Formula result:** = 5000
- Help on this function:** [Help on this function](#)

**Some important points to remember:**

The column you are looking in (Employee in this case) must be sorted in **A-Z order** – for either form of the **LOOKUP** function. (The same is true for the **VLOOKUP** and **HLOOKUP** functions, which you will see shortly).

The **LOOKUP** function assumes that the first column specified is the column where it will find a match. In other words, Excel looks at **G1**, sees the Employee name, and then goes down the first column in the Array, or the Lookup Range, until it finds a match. If the first column had not been Employee name, then Excel would not have found a match, and you would have received an error message.



## **Review Questions – Section 1**

The review questions accompanying this course are designed to assist you in achieving the course learning objectives. The review section is not graded; do not submit it in place of your qualified assessment. While completing the review questions, it may be helpful to study any unfamiliar terms in the glossary in addition to course content. After completing the review questions, proceed to the review question answers and rationales.

1. The Excel LOOKUP function has \_\_\_\_\_ form(s).
  - a. 1
  - b. 2
  - c. 3
  - d. 4
  
2. To create a drop-down list you would select List from the \_\_\_\_\_ section of the Data Validation's Validation criteria dialog box.
  - a. Allow:
  - b. Data:
  - c. Source
  - d. Validate

## VLOOKUP Function

The **VLOOKUP**, as I mentioned earlier, is the most popular Lookup function. It differs from other lookup functions, such as **LOOKUP** and **CHOOSE**, in that the data is housed inside a lookup table, rather than in the function argument itself. (Interestingly, in Excel Help, it strongly recommends not using the **LOOKUP Array Form** and to instead use **VLOOKUP**.)

The **VLOOKUP** function allows you to locate data within a defined table, often referred to as an array. In this context, an array is a range of cells containing text, numbers, or logical values that you want to compare with the lookup value. The **VLOOKUP** function searches for a value, in the **leftmost** column of a table, and then returns a value in the same row from a column you specify in the table.

The syntax for **VLOOKUP** is:

**=VLOOKUP (lookupvalue, table\_ array, col\_index\_number, range lookup, False).**

<b>Lookup_Value</b>	The cell you want Excel to lookup or match.
<b>Table_Array</b>	The location (range of cells) of your lookup table.
<b>Col_Index_Num</b>	The column number in the lookup range that has the data you are seeking.
<b>Range_Lookup</b>	If you use False, and there is not an exact match, a value is not returned. Use True or blank if you don't need an exact match. <b>Using False is highly recommended.</b>

Let's break this apart and look at it in terms of the example below. In cell **F3**, we want to display the Product Name associated with the Product ID found in cell **E3**. The lookup table containing the information is in Columns **K** through **O**.

Order Entry Information						Look Up Table						
Customer	Requested Ship	Product ID	Product Name	Quantity	Unit Price	Product ID	Category	Product Line	Type	Product Name	Size	Price
Williams Gardens	4/20/2013	BG-CF-23				BA-PF-45	Tree	Fruit	Pear	Bartlett Pear	4-5 Ft	\$ 16.95
Buckeye Gardens	10/25/2013	BH-SV-67				BA-PF-67	Tree	Fruit	Pear	Bartlett Pear	6-7 Ft	\$ 39.95
Pence Nursery	3/10/2013	BO-PF-45				BA-PF-89	Tree	Fruit	Pear	Bartlett Pear	8-9 Ft	\$ 64.95
Walden Nursery	4/2/2014	CE-DB-8H				BG-CF-23	Tree	Fruit	Cherry	Bing Cherry	4-5 Ft	\$ 17.95
Western Landscapin	11/5/2013	DC-DF-DB				BH-SV-45	Tree	Ornamental	Birch	Silver Birch	4-5 Ft	\$ 24.95
Thoreau Reflections	12/15/2013	DC-DF-DB				BH-SV-67	Tree	Ornamental	Birch	Silver Birch	6-7 Ft	\$ 39.95
Hoozier Trees	10/25/2013	GA-AF-45				BH-SV-89	Tree	Ornamental	Birch	Silver Birch	8-9 Ft	\$ 69.95
Buckeye Gardens	10/25/2013	ME-PB-89				BO-PF-45	Tree	Fruit	Pear	Bosc Pear	4-5 Ft	\$ 16.95
Daley Winery	10/29/2013	WG-VL-34				BO-PF-67	Tree	Fruit	Pear	Bosc Pear	6-7 Ft	\$ 39.95
						BO-PF-89	Tree	Fruit	Pear	Bosc Pear	8-9 Ft	\$ 64.95
						CE-DB-8H	Décor	Birding	Bird House	Cottage Birdhouse		\$ 16.63
						CG-VL-34	Vines	Seedless	Grape	Concord	3-4 Ft	\$ 8.95
						DC-DF-85	Décor	Furniture	Bench	Daisy Chain Bistro Set		\$ 250.00
						DC-DF-DB	Décor	Furniture	Bench	Daisy Chain Bench		\$ 199.00
						DC-DS-WF	Décor	Statuary	Fountain	Daisy Chain Water Fountain		\$ 79.50

Using the example above we would know the following:

Lookup_Value	Cell <b>E3</b>	We want to look up Product ID BG-CF-23.
Table_array	<b>\$K\$3:\$O\$17</b>	The lookup table containing the information we are searching for is in K3 through O17. The dollar signs (\$) around K3:O17 make the range an absolute cell reference. The absolute cell reference ensures that when we copy the formula down, it will continue to reference the correct range of cells.
Col_Index_Num	<b>5</b>	The data we want is in Column O, which is the 5 <sup>th</sup> column of the table and is labeled Product Name.
Range_lookup	<b>False</b>	If your data is not sorted, you must select False or you may get an incorrect answer.

Sounds simple, however, there are a couple of things to be aware of as you start using **VLOOKUP**.

*First the basics:*

- The **V** in **VLOOKUP** stands for *Vertical* which means that Excel goes down a column when searching.
- Your data and your lookup table (table\_array) can be located in the same worksheet, or the same workbook, or a different workbook. In this EBook, the data and lookup table are combined on the same sheet for convenience and ease of use as you go through the exercises, and to make it easier to see and visualize in the screenshots.

- Make sure your `Table_array` is set up as an absolute cell or range name to ensure that you do not get errors or an incorrect answer when you copy the lookup functions down. Instead of selecting the cell references, I recommend creating a range name. It is easier to use and to remember, and it ensures that the table will be treated as an absolute cell reference. (In the next exercise, we will create a range name, in case you are a little rusty in this area.)
- Excel assumes that your lookup table is sorted in alphabetical order by the leftmost column. If it is not sorted, and you forget to use the `Range_Lookup` **False**, you will either get an incorrect answer or an error message. If you do not have an exact match, and you forget to use `False`, then Excel will find the closest number to what you are looking for. If you are looking up costs, prices, sales or inventory figures, you don't want Excel to choose what it thinks is a close number, so use **FALSE**.

Let's create a range name for the lookup up table.

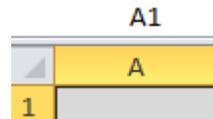
### Create a Range Name

Range names are treated as absolute cell references, so when you copy down your formula, the cell references will not move—they will remain fixed.

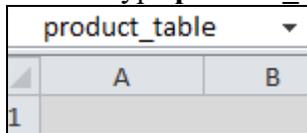
### LET'S TRY IT!

Let's create a range name. We will use it in the following exercise.

1. Open `VLOOKUP_FUNCTION.xlsx` and select `VLOOKUP_Garden` worksheet.
2. Select **K3:Q30**. This range comprises the lookup table data.



3. Click in the *Name Box* located just above *Column A*.
4. Type **product\_table** in the *Name Box* and press *Enter*.



That's it—you have created a range name. This works in all versions of Excel. We used an underscore because Excel does not allow range names to have spaces. Range Names must also begin with a letter—not a number.

☞ There are rules for naming Range Names. For more information on range names check out my blog on [excel\\_diva.blogspot.com](http://excel-diva.blogspot.com). The address to the entry on range names is <http://excel-diva.blogspot.com/2009/08/excel-tip-range-names.html>

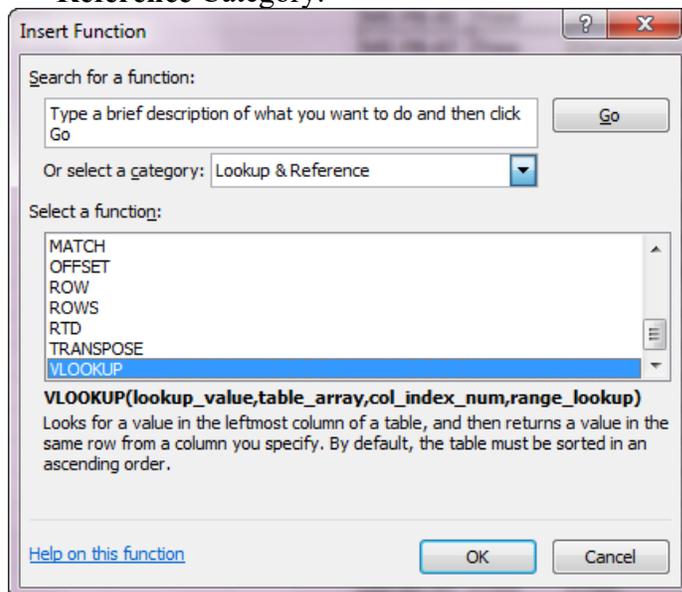
### LET'S TRY IT!

We are going to use a Nursery and Garden Supply scenario, as we walk through the mechanics of using a **VLOOKUP**. We want to match and then retrieve the Product Name for the order entry form based upon the Product ID information.

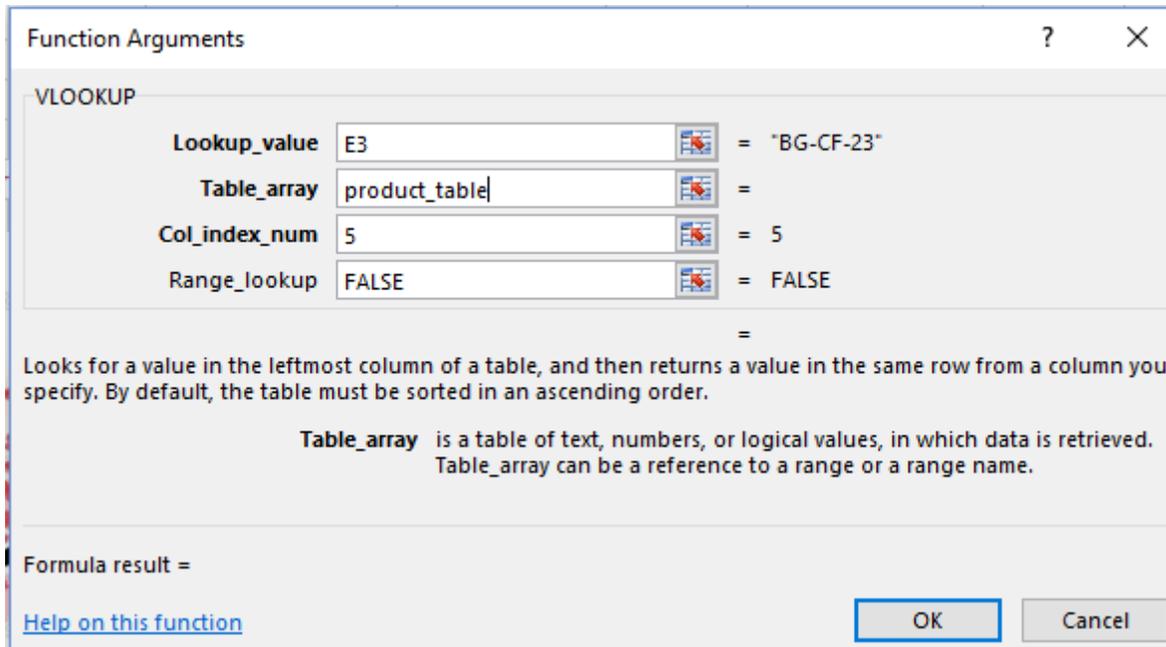
5. Open VLOOKUP\_FUNCTION.xlsx if necessary and select the sheet named VLOOKUP\_Garden.

	C	D	E	F	G	H
1	Order Entry Information					
2	Customer	Requested Ship	Product ID	Product Name	Quantity	Unit Price
3	Williams Gardens	4/20/2013	BG-CF-23			
4	Buckeye Gardens	10/25/2013	BH-SV-67			
5	Pence Nursery	3/10/2013	BO-PF-45			

6. Click in Cell **F3**. That is where we want the answer to go.
7. Click on the **Insert Function** button  and select **VLOOKUP** from the **Lookup & Reference** Category.



8. Click **OK**.  
*In the Function Argument dialog box, we are going to enter the information below:*



- We are looking up Product ID so the lookup value is **E3** which is BG-CF-23.
- You could type product\_table into the Table\_array area. However, it is easier to press **F3** which displays a list of range names, and you can select the appropriate one. In this case, we only have one range name, product\_table, created so far.
- In the lookup table, the **5<sup>th</sup>** column over is the column containing what we want to match, which is the Product ID.
- Range lookup is **False** since the first column of our table is not sorted.

9. Click **OK**.

10. **Copy** the formula down.

*The results should be like those below:*

	A	B	C	D	E	F
1	Order Entry Information					
2	Salesperson	State	Customer	Requested Ship	Product ID	Product Name
3	Brown	RI	Williams Gardens	4/20/2013	BG-CF-23	Bing Cherry
4	Daniels	OH	Buckeye Gardens	10/25/2013	BH-SV-67	Silver Birch
5	Daniels	IN	Pence Nursery	3/10/2013	BO-PF-45	Bosc Pear
6	Adams	MA	Walden Nursery	4/2/2014	CE-DB-BH	Cottage Birdhouse
7	Houston	TX	Western Landscapin	11/5/2013	DC-DF-DB	Daisy Chain Bench
8	Adams	MA	Thoreau Reflections	12/15/2013	DC-DF-DB	Daisy Chain Bench
9	Daniels	IN	Hoosier Trees	10/25/2013	GA-AF-45	Gala
10	Daniels	OH	Buckeye Gardens	10/25/2013	ME-PB-89	Paperback Maple
11	Cook	IL	Daley Winery	10/29/2013	WG-VL-34	Wine

11. **Save** the file.

Again, this is easy and similar to the **LOOKUP**. The lookup table is the big difference. If you are looking up more than 3 or 4 items, you will probably want to use a lookup table and **VLOOKUP**, rather than the **LOOKUP** function. If you are copying down and looking up a lot of values, the lookup table is the best method.

☞Remember, when you are creating a lookup table, whatever value you are going to search for needs to be in the first column. There is a work around to this limitation. It will be explained later in this EBook.

**Review Exercise**

On Your Own- Use VLOOKUP To Find Price

Before we move on to more advanced topics, give this a try on your own. We will use the same example, but this time let’s look up the **Unit Price**.

Open **VLOOKUP\_Function.xlsx** (if you closed it) and click on the sheet named **VLOOKUP\_Review**.

1. Find the Unit Price of the products based upon **Product\_ID**.

☞Range Names can be used throughout a file, so you do not need to create a new range name for the lookup table on the review sheet. However, it is a good idea to practice creating range names if you are not familiar with them.

**Hint:** The only difference is the lookup column. If you do it correctly, you should be able to look at Row 11 and see that Daley Winery’s Unit Price for WG-VL-34 is \$9.95. If you have any difficulty - check the answer sheet – it immediately follows the exercise in the Excel file.

	A	B	C	D	E	F	G	H
1	Order Entry Information							
2	Salesperson	State	Customer	Requested Ship	Product ID	Product Name	Quantity	Unit Price
3	Brown	RI	Williams Gardens	4/20/2013	BG-CF-23	Bing Cherry		17.95
4	Daniels	OH	Buckeye Gardens	10/25/2013	BH-SV-67	Silver Birch		39.95
5	Daniels	IN	Pence Nursery	3/10/2013	BO-PF-45	Bosc Pear		16.95
6	Adams	MA	Walden Nursery	4/2/2014	CE-DB-BH	Cottage Birdhouse		16.65
7	Houston	TX	Western Landscapin	11/5/2013	DC-DF-DB	Daisy Chain Bench		199
8	Adams	MA	Thoreau Reflections	12/15/2013	DC-DF-DB	Daisy Chain Bench		199
9	Daniels	IN	Hoosier Trees	10/25/2013	GA-AF-45	Gala		15.95
10	Daniels	OH	Buckeye Gardens	10/25/2013	ME-PB-89	Paperback Maple		69.95
11	Cook	IL	Daley Winery	10/29/2013	WG-VL-34	Wine		9.95

## **Review Questions – Section 2**

The review questions accompanying this course are designed to assist you in achieving the course learning objectives. The review section is not graded; do not submit it in place of your qualified assessment. While completing the review questions, it may be helpful to study any unfamiliar terms in the glossary in addition to course content. After completing the review questions, proceed to the review question answers and rationales.

3. If there are 3 columns in the lookup table (table array), VLOOKUP will search down the \_\_\_\_\_ column as it tries to match the lookup value.
  - a. First
  - b. Second
  - c. Third
  - d. VLOOKUP will search whatever column is specified by the user

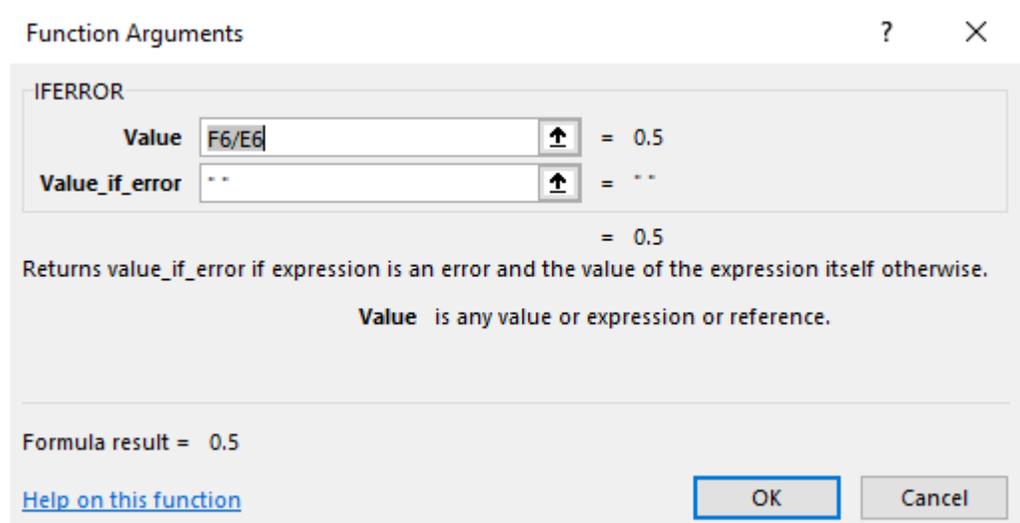


## VLOOKUP With IFERROR

People were excited when Excel 2007 was introduced because of the **IFERROR** function.

**IFERROR** tests a calculation's answer for an error. If the value or resulting calculation does not have an error, the answer is automatically entered into the cell. If the resulting calculation contains an error, then you can tell Excel what to replace the error message with.

In the example below, I told Excel to divide cell **F6** from **E6** and to display a blank space if the answer results in an error, such as **DIV/0** or **#N/A**. Excel treats anything inside quotation marks as a literal.



Before the **IFERROR** function was created, you had to combine an **IF** and the **ISERROR** function together if you did not want an error message to display. The most common use of the **IFERROR** function is in combination with the **VLOOKUP**, since the **VLOOKUP** displays a **#N/A** whenever a match is not found. In Excel 2016, Microsoft introduced **IFNA**, which is similar to the **IFERROR**, except it only tests for **#N/A**, and it was probably designed for use with the lookup functions.

Let's go back to the example we used before, only this time I am changing E4 to a Product ID that does not exist. Since the **VLOOKUP** cannot find a match it returned a **#N/A**.

Order Entry Information					Look Up Table					
Customer	Requested Ship	Product ID	Product Name	Quantity	Unit Price	Product ID	Category	Product Line	Type	Product Name
Williams Gardens	4/20/2013	BG-CF-23	Bing Cherry			DC-DS-WF	Décor	Statuary	Fountain	Daisy Chain Water Fountain
Buckeye Gardens	10/25/2013	BZ-FF-XX	#N/A			CE-DB-BH	Décor	Birding	Bird House	Cottage Birdhouse
Pence Nursery	3/10/2013	BO-PF-45				HF-DB-BH	Décor	Birding	Bird Feeder	Hummingbird Feeder
Walden Nursery	4/2/2014	CE-DB-BH				FP-DB-BB	Décor	Birding	Bird Bath	Flower Petal Birdbath
Western Landscapin	11/5/2013	DC-DF-DB				DC-DF-DB	Décor	Furniture	Bench	Daisy Chain Bench
Thoreau Reflections	12/15/2013	DC-DF-DB				DC-DF-BS	Décor	Furniture	Bench	Daisy Chain Bistro Set
Hoosier Trees	10/25/2013	GA-AF-45				ME-PB-45	Tree	Ornamental	Maple	Paperback Maple
Buckeye Gardens	10/25/2013	ME-PB-89				ME-PB-67	Tree	Ornamental	Maple	Paperback Maple
Daley Winery	10/29/2013	WG-VL-34				ME-PB-89	Tree	Ornamental	Maple	Paperback Maple
						ME-BJ-45	Tree	Ornamental	Maple	Bloodgood Japanese Maple
						ME-BJ-67	Tree	Ornamental	Maple	Bloodgood Japanese Maple
						ME-BJ-89	Tree	Ornamental	Maple	Bloodgood Japanese Maple
						BH-SV-45	Tree	Ornamental	Birch	Silver Birch
						BH-SV-67	Tree	Ornamental	Birch	Silver Birch
						BH-SV-89	Tree	Ornamental	Birch	Silver Birch
						BA-PF-45	Tree	Fruit	Pear	Bartlett Pear
						BA-PF-67	Tree	Fruit	Pear	Bartlett Pear
						BA-PF-89	Tree	Fruit	Pear	Bartlett Pear
						BO-PF-45	Tree	Fruit	Pear	Bosc Pear
						BO-PF-67	Tree	Fruit	Pear	Bosc Pear
						BO-PF-89	Tree	Fruit	Pear	Bosc Pear
						BG-CF-23	Tree	Fruit	Cherry	Bing Cherry

To correct this, we simply add =IFERROR (in front of the VLOOKUP, and at the end add a “Product Not Found”) or try it with IFNA if you have Excel 2016 or higher. IFNA only checks for #N/A errors which is why it is typically used with lookup functions.

Order Entry Information					
Customer	Requested Ship	Product ID	Product Name	Quantity	Unit Price
Williams Gardens	4/20/2013	BG-CF-23	Bing Cherry		
Buckeye Gardens	10/25/2013	BZ-FF-XX	Product Not Found		
Pence Nursery	3/10/2013	BO-PF-45			
Walden Nursery	4/2/2014	CE-DB-BH			
Western Landscapin	11/5/2013	DC-DF-DB			
Thoreau Reflections	12/15/2013	DC-DF-DB			

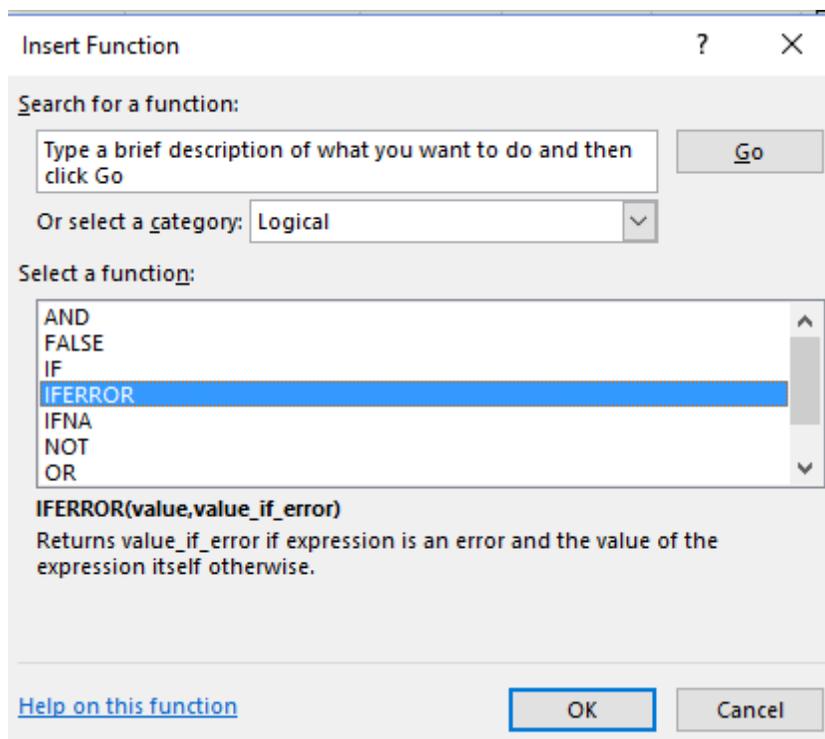
☞ I used “Product Not Found” – if you wanted the cell to just display a blank you could use a space enclosed in quotation marks “ ”. Excel displays whatever is between the quote marks.

**Tip:** If you don’t want to type everything and want some help with the parentheses, you can use the  button. I tend to use this when I am nesting IF functions, as it helps you keep track of where you are.

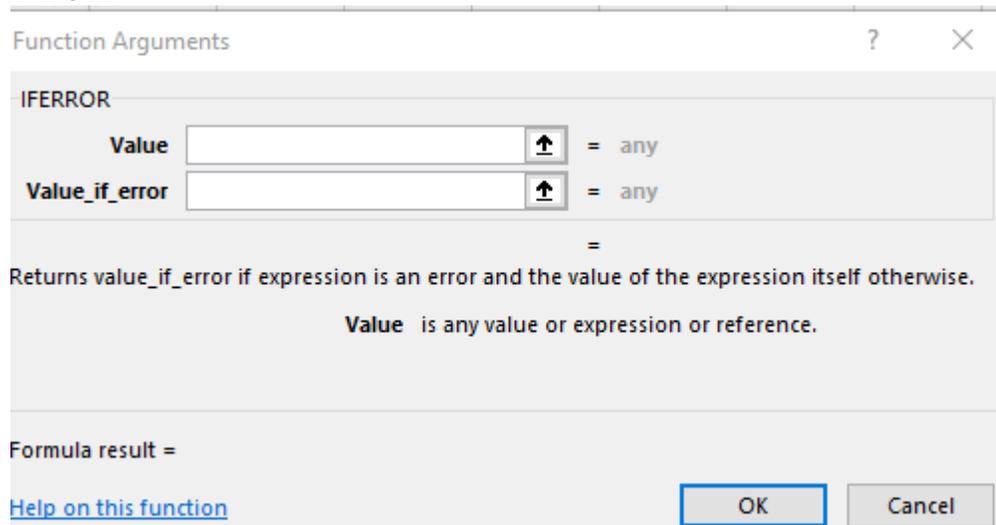
### LET’S TRY IT!

Let’s look up the Product Name from the lookup table using VLOOKUP and IFERROR

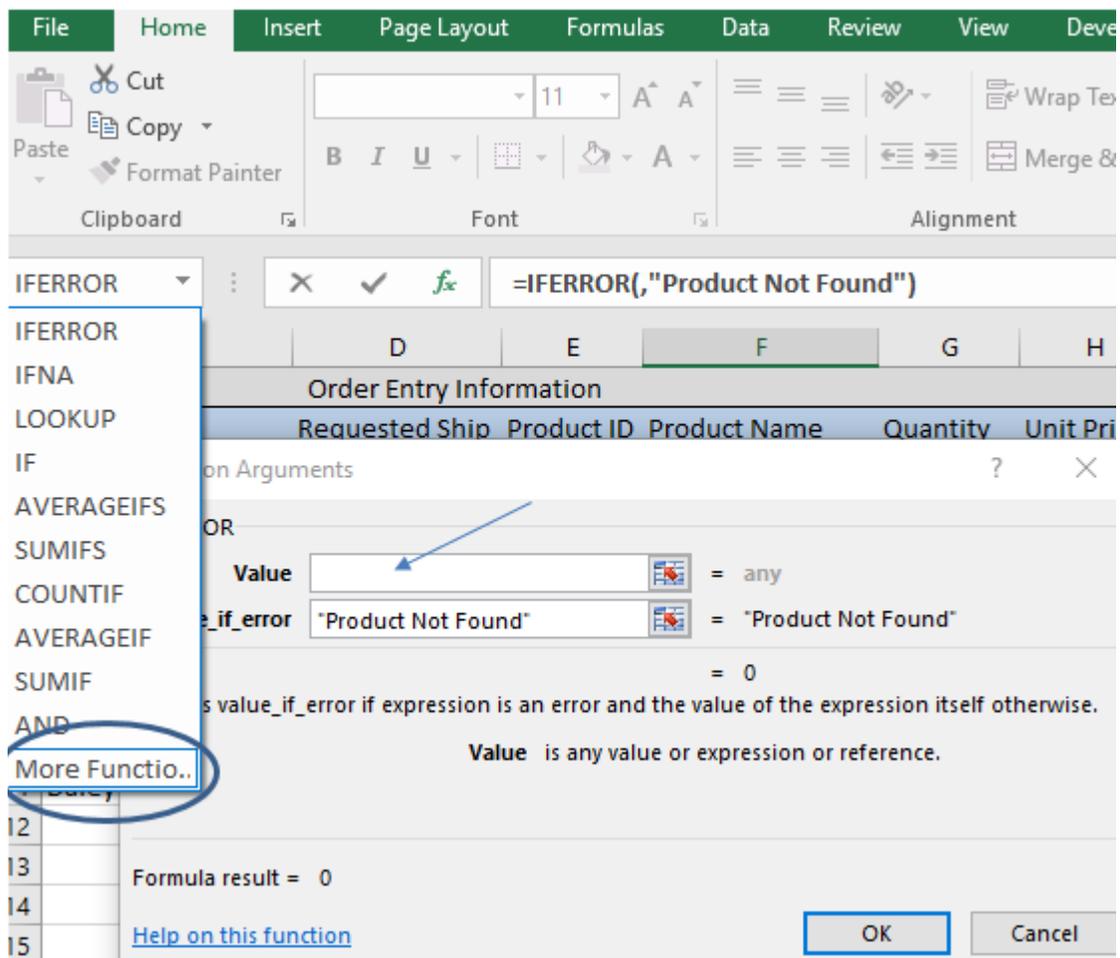
1. Select the VLOOKUP\_Garden\_IFERROR sheet from VLOOKUP\_FUNCTION xlxs.
2. Click in cell F3 Click on the  icon and select IFERROR or IFNA, if you prefer, from the **Logical** function category.



3. Click **OK**.



4. In the *Value\_if\_error* dialog box, type “ “ or “Product Not Found” if you prefer. *If you don't enter the Value\_if\_error component first, you manually have to enter it, or you have to get back into the VLOOKUP dialog box. It is easier to do the Value\_if\_error section first.*
5. Click in the *Value* dialog box to select it. **This is very important, otherwise the next formula will not be in the correct place.**
6. Move your cursor up and click on the drop box beside the *Name Box*. The Name Box is located directly above Column A.



7. Select the **VLOOKUP** function from the list. If you don't see it click on *More Functions*.... and search for it in the *Lookup and Reference* category.

The screenshot shows an Excel spreadsheet with the following data:

	C	D	E	F	G	H
1	Order Entry Information					
2	Customer	Requested Ship	Product ID	Product Name	Quantity	Unit Price
3	Williams Gardens	4/20/2013	BG-CF-23	=IFERROR(VLOOKUP(),"Product Not Found")		
4	Buckeye Gardens	10/25/2013	BZ-FF-XX			
5	Pence Nurse					
6	Walden Nur					
7	Western Lar					
8	Thoreau Ref					
9	Hoosier Tre					
10	Buckeye Gar					
11	Daley Winer					

The 'Function Arguments' dialog box for VLOOKUP is open, showing the following fields:

- Lookup\_value: (empty)
- Table\_array: (empty)
- Col\_index\_num: (empty)
- Range\_lookup: (empty)

Below the fields, there is a description: "Lookup\_value is the value to be found in the first column of the table, and can be a value, a reference, or a text string." At the bottom, there are 'OK' and 'Cancel' buttons.

Excel automatically takes care of all the parentheses which makes it easier to get it right on the first try.

8. Enter the information as shown below. This is exactly the same formula we created earlier. If you want to use your range name in the Table\_array that is fine.

The 'Function Arguments' dialog box for VLOOKUP is shown with the following values:

- Lookup\_value: E3 = "BG-CF-23"
- Table\_array: \$K\$3:\$Q\$30 = {"BA-PF-45", "Tree", "Fruit", "Pear", "Bartle"} (Note: The screenshot shows a partial list of values)
- Col\_index\_num: 5 = 5
- Range\_lookup: false = FALSE

Below the fields, there is a description: "Looks for a value in the leftmost column of a table, and then returns a value in the same row from a column you specify. By default, the table must be sorted in an ascending order." Below that, it says: "Range\_lookup is a logical value: to find the closest match in the first column (sorted in ascending order) = TRUE or omitted; find an exact match = FALSE." At the bottom, the formula result is "Bing Cherry" and there are 'OK' and 'Cancel' buttons.

9. Click **OK** and **copy** it down.

You should see the second product name is blank or says Product Not Found – depending upon what you decided to enter in the Value\_if\_error dialog box. Personally, I prefer blanks as it looks cleaner.

If you have Excel 2016 or higher and want to try **IFNA**, the formula could look like this:  
**=IFNA(VLOOKUP(E3,\$K\$3:\$Q\$30,5,FALSE),"Product Not Found ")**.

### **Review Exercise**

On Your Own-Use **IFERROR** and **VLOOKUP** To Find Quantity

1. Click on the Sheet named **VLOOKUP\_Garden\_IFERROR**, if necessary, and create a **VLOOKUP** incorporating the **IFERROR** function to find Unit Price.
2. Create a blank display if a Unit Price cannot be found.  
The answer can be found in the answer sheet—it immediately follows the exercise sheet.  
On the answer sheet in the Excel file, I used **IFNA** on column H so you could see how it is it set up.

Now, let's look at other things you can do with **VLOOKUP**.

### **VLOOKUP And Wildcards**

I typically don't use wildcards with **VLOOKUPs** as I am usually looking up something specific. However, I have seen a lot of messages on help boards asking how to combine a **VLOOKUP** and wildcards, so I thought I would include a quick example.

In **Column K**, I have a parts listing showing items such as Washer, Valve and Wrench. I want to find the bin locations of some of these items. However, the parts database lists everything by specific part rather than by a category, so I need Excel to search until it finds some type of wrench and then display its bin location.

I created a data validation in cell **G1** and then selected **Wrench** as the item I am searching for. I want the bin location to display in **G2**.

Part	Bin Location
Gangley Pliers	Bin 4 - M
HCAB Washer	Bin 3 -O
Finley Sprocket	Bin 5 - O
6" Sonotube	Bin 8 -M
Langstrom 7" Wrench	Bin10 -M
Thompson Socket	Bin 6 -P
S-Joint	Bin 2 - M
LAMF Valve	Bin 20- V

Function Arguments

VLOOKUP

Lookup\_value: "\*"&G1&"\*" = "\*"Wrench"

Table\_array: \$A\$3:\$B\$10 = {"Gangley Pliers";"Bin 4 - M";"HCAB ...

Col\_index\_num: 2 = 2

Range\_lookup: FALSE = FALSE

Formula result = Bin10 -M

Let's look at the parts of the **VLOOKUP** argument. Column A does not have a part called Wrench so it can't find a match. Consequently, we need to use a wildcard to tell Excel to search for a value that contains the word wrench in it. To accomplish this, we need to use the asterisk. Excel recognizes the \* as a wildcard character and it represents any number of characters. I am going to put quotes around it because the \* is not a number and is considered text. The Lookup\_value value is "\*"&G1&"\*". The ampersand (&) is like a plus sign—it allows us to join or add text together. We need the ampersand on both sides as we are joining the first wildcard character to G1, and then that is being joined to the second wildcard character. Excel reads this as =\*G1\* and it knows that cell G1 is Wrench, so it is going to search for \*Wrench\* which means it will search for a cell that contains the word wrench somewhere in it. The Table\_array is \$A\$3:\$B\$10. We want to retrieve information from the second column and we want an exact match. The actual calculation is: =**VLOOKUP**("\*"&G1&"\*", \$A\$3:\$B\$10, 2, FALSE).

☞ Anyone see a problem with this wildcard scenario? Yes, you guessed it! A **VLOOKUP** stops as soon as it finds a match, so if there were a second wrench type in a different bin location, we would not find it. All the lookups work this way – just something to remember – once it finds a match, it stops.

### Review Exercise-On Your Own

Combine VLOOKUP And A Wildcard.

1. Open up VLOOKUP\_WILDCARD.xlsx and click on the sheet named Wildcard.
2. Create a **VLOOKUP** using a wildcard to find any parts that are valves.

	A	B	C	D	E	F	G	H	I	J	K
1						Part	Valve				Lookup Table
2	Parts	Bin Location				Part Bin Location					Pliers
3	Gangley Pliers	Bin 4 - M									Washer
4	HCAB Washer	Bin 3 -O									Sprocket
5	Finley Sprocket	Bin 5 - O									Wrench
6	6" Sonotube	Bin 8 -M									Valve
7	Langstrom 7" Wrench	Bin10 -M									
8	Thompson Socket	Bin 6 -P									
9	S-Joint	Bin 2 - M									
10	LAMF Valve	Bin 20- V									

The answer is on the following sheet in the file.

### Review Exercise

On Your Own

If you want more practice.

B	C	D	E	F	G
				Product	Quantity
Product	Quantity			Cashmere	
Tams	25				
Baseball Caps	75				
Ski Caps	10				
Wool- Headbands	30				
Leather Gloves	50				
Knit Gloves	65				
Fingerless Gloves	5				
Wool Scarves	2				
Cashmere Scarves	1				
Knit Scarves	10				
Youth Caps	15				
Infinity-Wool	85				
Infinity-Cashmere	10				
Knit Mittens	100				
Cashmere Mittens	5				
Cashmere-headbands	20				

Notice I have multiple Cashmere products.



### **Review Questions – Section 3**

The review questions accompanying this course are designed to assist you in achieving the course learning objectives. The review section is not graded; do not submit it in place of your qualified assessment. While completing the review questions, it may be helpful to study any unfamiliar terms in the glossary in addition to course content. After completing the review questions, proceed to the review question answers and rationales.

4. \_\_\_\_\_ is a wildcard character.

- a. #
- b. \*
- c. \$
- d. !

## Combining VLOOKUPS

Combining **VLOOKUPS** is a simple idea, but one that never really occurred to me until I started writing this EBook. Instead of creating two separate **VLOOKUPS** and then creating a 3rd column to multiply or add the numbers together – you can do it all in one.

In the example below, my Order information is in Columns C through H, and the lookup table containing my data is in Columns K through R. (I added Column R for this example). What I want to do is find the **Total Price** for each customer's order. The **Total Price** is calculated as the **Unit Price** (Column Q) + **Shipping Cost** multiplied by the **Quantity** (Column G). My lookup value is **Product ID** in Column E.

To do this, I created a Price **VLOOKUP** to find the Unit **Price** in Column Q, then I typed a plus sign, and then I created a second **VLOOKUP** to retrieve the information in Column R. After that, I put parentheses around the entire equation and multiplied it by **G3** (Quantity). I then copied it down.

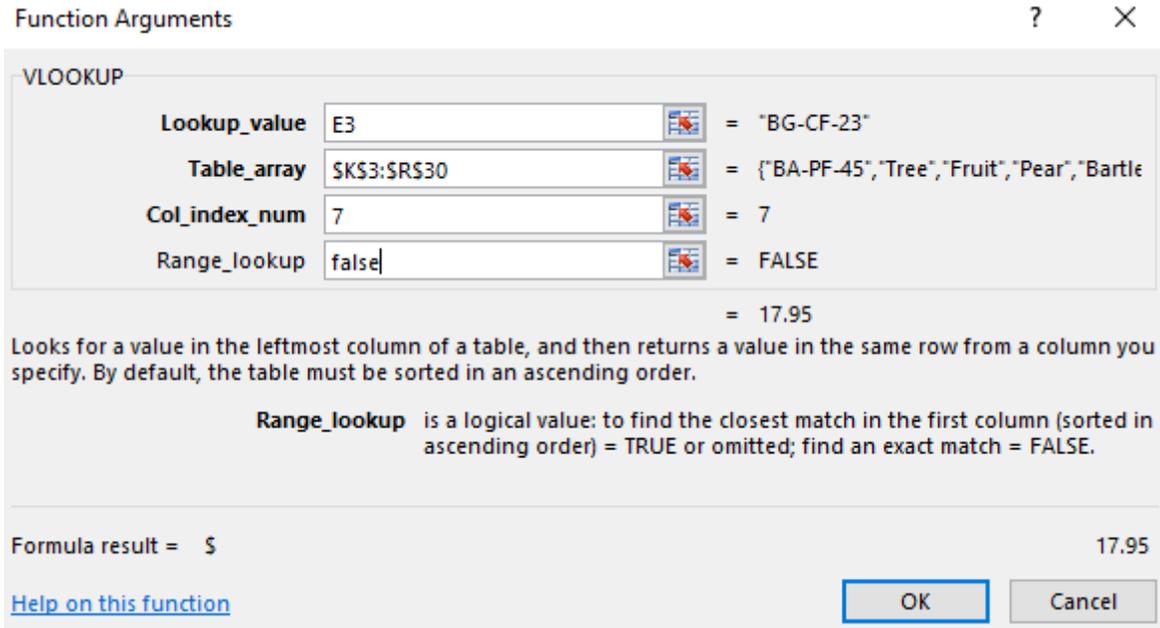
Order Entry Information							Look Up Table								
Salesperson	State	Customer	Requested Ship	Product ID	Product Name	Quantity	Total Price	Product ID	Category	Product Line	Type	Product Name	Size	Unit Price	Shipping Cost
Brown	RI	Williams Gardens	4/20/2013	BG-CF-23	Bing Cherry	2		BA-PF-45	Tree	Fruit	Pear	Bartlett Pear	4-5Ft	\$ 16.95	5
Daniels	OH	Buckeye Gardens	10/25/2013	BH-SV-67	Silver Birch	5		BA-PF-67	Tree	Fruit	Pear	Bartlett Pear	6-7 Ft	\$ 39.95	10
Daniels	IN	Pence Nursery	3/10/2013	BO-PF-45	Bosc Pear	10		BA-PF-89	Tree	Fruit	Pear	Bartlett Pear	8-9 Ft	\$ 64.95	15
Adams	MA	Walden Nursery	4/2/2014	CE-DB-BH	Cottage Birdhouse	20		BG-CF-23	Tree	Fruit	Cherry	Bing Cherry	4-5 Ft	\$ 17.95	5
Houston	TX	Western Landscapin	11/5/2013	DC-DF-DB	Daisy Chain Bench	2		BH-SV-45	Tree	Ornamental	Birch	Silver Birch	4-5Ft	\$ 24.95	2.95

The equation is: **=(VLOOKUP**

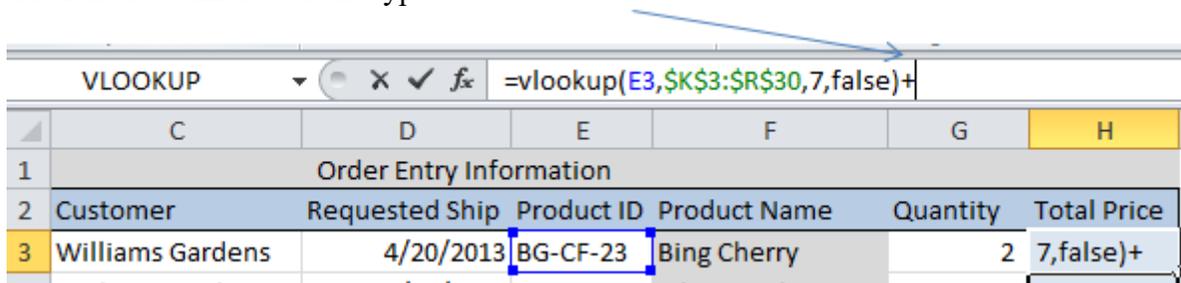
## LET'S TRY IT!

We are going to use 2 **VLOOKUPS** to pull Price and Shipping Information. Next, we will multiply by Quantity to determine Total Price.

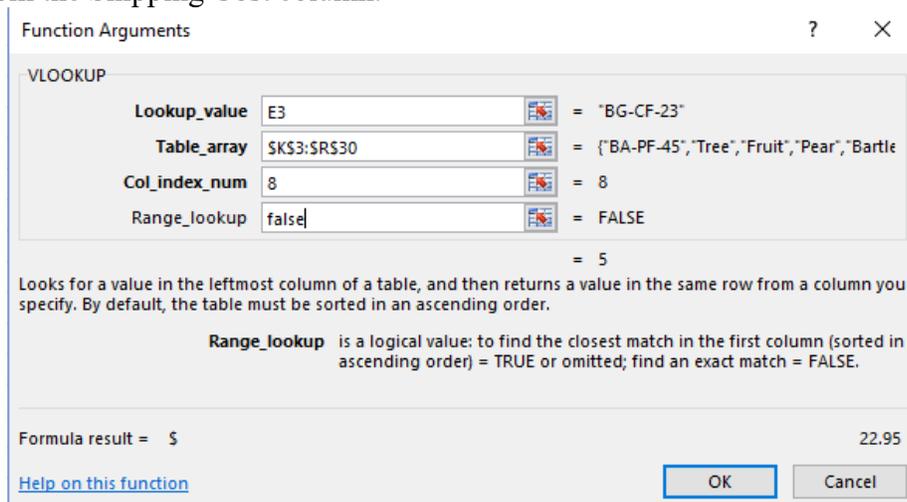
1. Open **VLOOKUP\_MULTIPLE.xlsx**.
2. Select the sheet named **VLOOKUP\_join** sheet, if necessary.
3. Click in Cell **H3**.
4. Click on the  icon and select the **VLOOKUP** function.
5. Enter the following information:
  - Lookup Value is Product ID (**E3**).
  - Table\_array is **\$K\$3:\$R\$30**. You can create a range name if you want.
  - Col\_index\_num is **7** as Price is 7 columns over.
  - Range\_lookup is set to **False** as we want an exact match only.



6. Click **OK**.
7. Click in the formula bar and type a +.



8. Click on the  icon and select the **VLOOKUP** function again.
9. Enter the following information as shown in the screenshot below. The only difference is that the Column Index Number has been changed from a 7 to an 8 as we want to retrieve data from the Shipping Cost column.



10. Click **OK**.
11. Click in the Formula bar area and enter a single Parenthesis before the first VLOOKUP and enter another single parenthesis at the very end of the equation after False.
12. Click on the multiplication operator **\***.
13. Click on cell **G3**.

	A	B	C	D	E	F	G	H
1	Order Entry Information							
2	Salesperson	State	Customer	Requested Ship	Product ID	Product Name	Quantity	Total Price
3	Brown	RI	Williams Gardens	4/20/2013	BG-CF-23	Bing Cherry	2	\$ 45.90
4	Daniels	OH	Buckeye Gardens	10/25/2013	BH-SV-67	Silver Birch	5	

14. Press *Enter*.
15. **Copy** the formula down.

Your answer should look similar to the screen shot below:

	A	B	C	D	E	F	G	H
1	Order Entry Information							
2	Salesperson	State	Customer	Requested Ship	Product ID	Product Name	Quantity	Total Price
3	Brown	RI	Williams Gardens	4/20/2013	BG-CF-23	Bing Cherry	2	\$ 45.90
4	Daniels	OH	Buckeye Gardens	10/25/2013	BH-SV-67	Silver Birch	5	\$ 249.75
5	Daniels	IN	Pence Nursery	3/10/2013	BO-PF-45	Bosc Pear	10	\$ 219.50
6	Adams	MA	Walden Nursery	4/2/2014	CE-DB-BH	Cottage Birdhouse	20	\$ 373.00
7	Houston	TX	Western Landscapin	11/5/2013	DC-DF-DB	Daisy Chain Bench	2	\$ 428.00
8	Adams	MA	Thoreau Reflections	12/15/2013	DC-DF-DB	Daisy Chain Bench	5	\$ 1,070.00
9	Daniels	IN	Hoosier Trees	10/25/2013	GA-AF-45	Gala	4	\$ 83.80
10	Daniels	OH	Buckeye Gardens	10/25/2013	ME-PB-89	Paperback Maple	10	\$ 849.50
11	Cook	IL	Daley Winery	10/29/2013	WG-VL-34	Wine	10	\$ 149.50

### Review Exercise

On Your Own - Use 2 VLOOKUPs To Find Quantity And Cost Data And Then Multiply It To Determine Inventory Cost.

1. Open VLOOKUP\_MULTIPLE.xlsx, if necessary.
2. Select the sheet named VLOOKUP\_Multiply, if necessary.

- Click in cell **C3**.

	A	B	C	D	E	F	G	H
1	Part Number		B-111					
2	Description		6" Sonotube					
3	Inventory Cost							
4								
5								
6								
7								
8	Parts Database							
9		Number	Description	Location	Quantity	Cost	Retail	
10		D-178	Gangley Pliers	Bin 4 - M	57	\$ 10.47	\$ 17.95	
11		A-201	HCAB Washer	Bin 3 -O	856	\$ 0.12	\$ 0.25	
12		C-098	Finley Sprocket	Bin 5 - O	357	\$ 1.57	\$ 2.95	
13		B-111	6" Sonotube	Bin 8 -M	86	\$ 15.24	\$ 19.95	
14		D-017	Langstrom 7" Wrench	Bin10 -M	75	\$ 18.69	\$ 27.95	
15		C-321	Thompson Socket	Bin 6 -P	298	\$ 3.11	\$ 5.95	
16		A-182	S-Joint	Bin 2 - M	155	\$ 6.85	\$ 9.95	
17		B-047	LAMF Valve	Bin 20- V	482	\$ 4.01	\$ 6.95	

- Create a **VLOOKUP** that retrieves Cost information for the part number in Cell **C1**, and then multiply it by a **VLOOKUP** that retrieves the Quantity on hand.

Your answer should look similar to the screen shot below:

	A	B	C
1	Part Number		B-111
2	Description		6" Sonotube
3	Inventory Cost		1,310.64

The answer sheet can be found in the same file if you have any difficulties. I have also made a couple of comments that you might find useful.

## VLOOKUP With Other Functions

Another example of combining **VLOOKUP** with a second function is incorporating it with an IF Statement. The combination of the **IF** and the **VLOOKUP** function is popular.

### VLOOKUP and IF

For example, if shipping costs were high, you might want to increase the retail price of any part that had a retail price of less than \$1 by 20%. Your equation would look something like this:  
`=IF(VLOOKUP(C1,$B$10:$G$17,6,FALSE)<1,1.2*(VLOOKUP(C1,$B$10:$G$17,6,"false")),VLOOKUP(C1,$B$10:$G$17,6,FALSE))`

This formula tells Excel to look at the part's retail price in cell **G10**, and if it is less than **\$1.00**, increase the retail price by **20%**. Otherwise, just display the existing retail price. If your data was static, you could probably do this same thing with an IF and copy it down, but as I said, I just wanted to give you some ideas of what you can do with it.

C4    `=IF(VLOOKUP(C1,$B$10:$G$17,6,FALSE)<1,1.2*(VLOOKUP(C1,$B$10:$G$17,6,"false")),VLOOKUP(C1,$B$10:$G$17,6,FALSE))`

	A	B	C	D	E	F	G	H	I
1	Part Number		A-202						
2	Description		HCAB Washer						
3	Inventory Cost								
4	Price Increase?		0.3						
5									
6									
7									
8	Parts Database								
9		Number	Description	Location	Quantity	Cost	Retail		
10		D-178	Gangley Pliers	Bin 4 - M	57	\$ 10.47	\$ 17.95		
11		A-202	HCAB Washer	Bin 3 - O	856	\$ 0.12	\$ 0.25		

You can see this example on the worksheet named **VLOOKUP** and IF answer.

Another combination of functions that you see all the time is the **IFERROR** or the **IFNA** with the **VLOOKUP**. This was covered earlier.

## VLOOKUP Across Multiple Sheets

I have seen some complicated formulas for looking up data across multiple sheets, and I did not include these examples in this EBook, because I thought they were too complicated. Then I discovered a YouTube Video that showed me an easy way to do this. If you like visuals, check it out – it is only 5 minutes long.<sup>1</sup> The video is much easier to understand compared to reading all of the steps. The URL is <http://www.youtube.com>

This only works on Excel 2007 and higher versions, as you need to incorporate the IFERROR function, which is a Logical function. It is unbelievably simple.

The syntax of IFERROR() is =(value,value\_if\_error). If you are not familiar with the logic function IFERROR take a look at my blog <http://excel-diva.blogspot.com/2009/10/iferror-function.html> Again, if you are visual, check out my YouTube video on it - <http://www.youtube.com/watch?v=Dl-qQXI897A>.

If you open the worksheet called VLOOKUP\_ACROSS\_MULTIPLE\_SHEETS.xlsx, you will see a summary sheet and 3 Product Line Sheets – Trees, Shrubs and Décor.

	A	B	C
1			
2			
3		Product ID	Sales
4		WG-VL-34	

Summary | Trees | Shrubs | Decor

On the summary sheet, we want to create a **VLOOKUP** in cell **C4** that will look up the sales for whatever Product ID is entered in cell **B4**. We did something similar in an earlier exercise, but here we need Excel to check the different sheets to find the correct Product ID. The Product ID WG-VL-34 is actually a Shrub product, so Excel needs to check all the Tree Product IDs, and when it can't find it, it will continue on to the next sheet and look for it there.

The calculation looks a little long but it is really very simple.

Click in cell **C4** and in the formula bar type the following:  
=IFERROR(VLOOKUP(B4,Trees!A1:F17,6,FALSE),IFERROR(VLOOKUP(Summary!B4,Shrubs!A1:F3,6,FALSE),IFERROR(VLOOKUP(Summary!B4,Decor!A1:F6,6,FALSE),"Not Found"))))

☛ If you are not familiar with linking syntax, the exclamation point between Trees and A1:F17 tells Excel that Trees is the sheet name, and the range after the exclamation point are the cell references.

Basically, we are stringing **VLOOKUP**s together interspersed with **IFError** functions.

The **VLOOKUP** is housed within the **IFERROR** function. First, we tell Excel to look at **B4** on the *Summary* sheet, and then go to the sheet named *Trees* and see the table *A1 through F17*, and

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<sup>1</sup> <http://www.youtube.com>

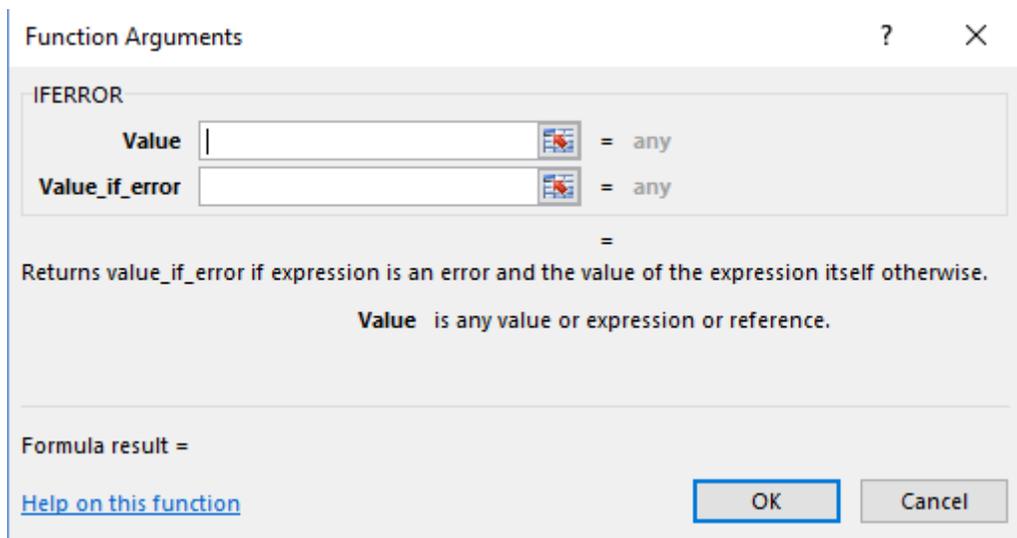
go over to the 6th Column to retrieve the Sales. If Excel can't find it, then go to the Shrubs sheet and look at the table *A1 through F3* and go over to the 6th column and retrieve the sales number. If Excel can't find it there, then go to the table on the Décor sheet and look at the 6th column. If you can't find it any of those 3 sheets, then display *Not Found* in cell *C4*. Please note that all the Product Line data ranges are different sizes, and while Sales was the 6th column in each of the tables, I did that to make it easier to visualize and follow.

We are going to walk through a simpler exercise where we are going to check 2 sheets, as I don't want to get too complicated here, but I want to make sure you understand the approach.

### LET'S TRY IT!

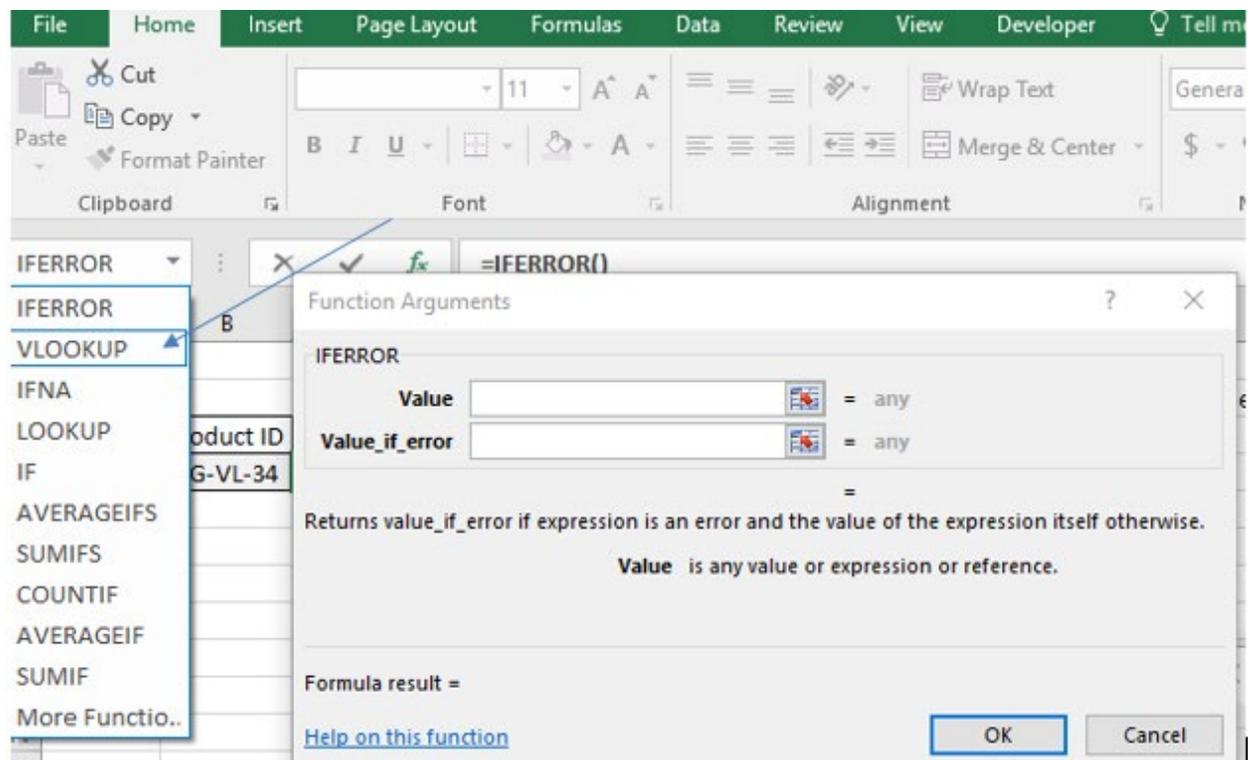
We want to find the Product Name that matches the Product ID, displayed in cell **B4**. To accomplish this, we are going to use **VLOOKUP** and **IFERROR** together to search through the sheets in the file.

1. Open **VLOOKUP\_ACROSS\_MULTIPLE\_SHEETS.xlsx** and click on cell **C4**.
2. Click on the  icon, and from the Logical category select **IFERROR**.
3. Click in *Value* section of the **IFERROR** dialog box.



4. Click on the *Name Box* and find the **VLOOKUP** function.

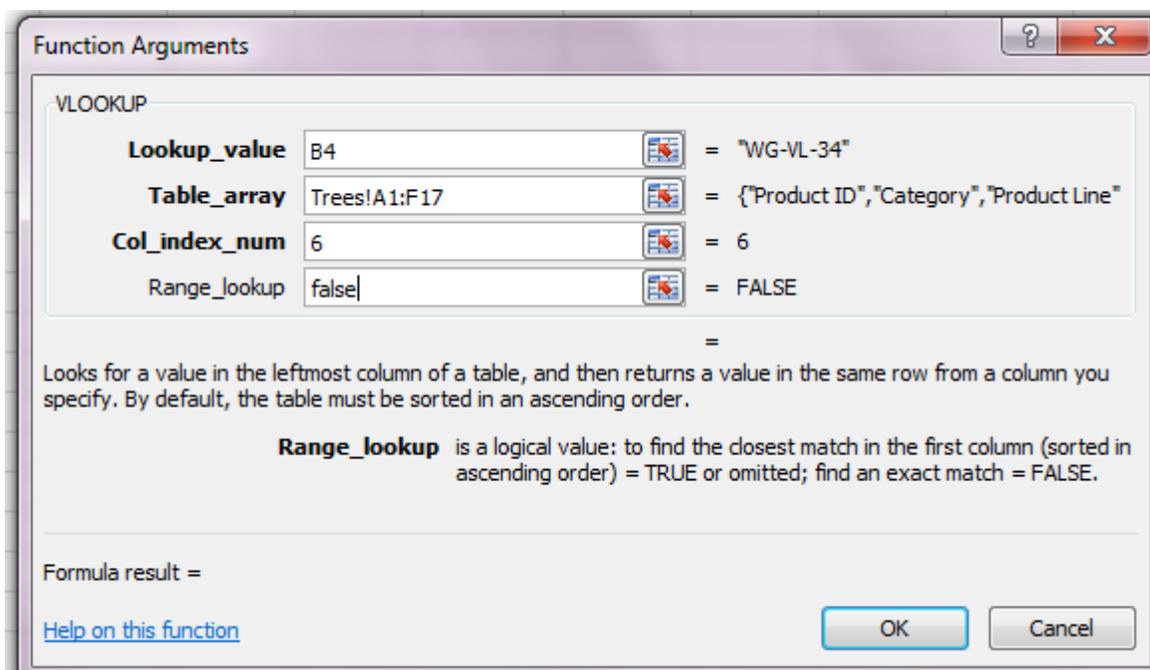




The IFERROR dialog box collapses but don't worry - if you look at the formula bar you can see that it is still there.

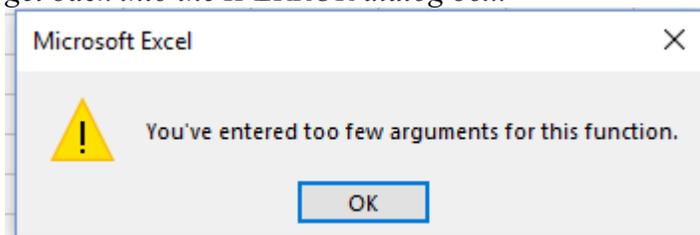


5. Click in the *Lookup\_value* section and enter **B4**.
6. Click in the *Table\_array* – Click on the tab called **Trees** to select that sheet and then select **A1:F17**.
7. Click in *Col\_index\_num* and select **6** as that is the column containing the Sales numbers.
8. Click in *Range-lookup* and type **False**.



9. Click **OK**.

*You will receive an error message as the IFERROR message is incomplete, and we have to get back into the IFERROR dialog box.*

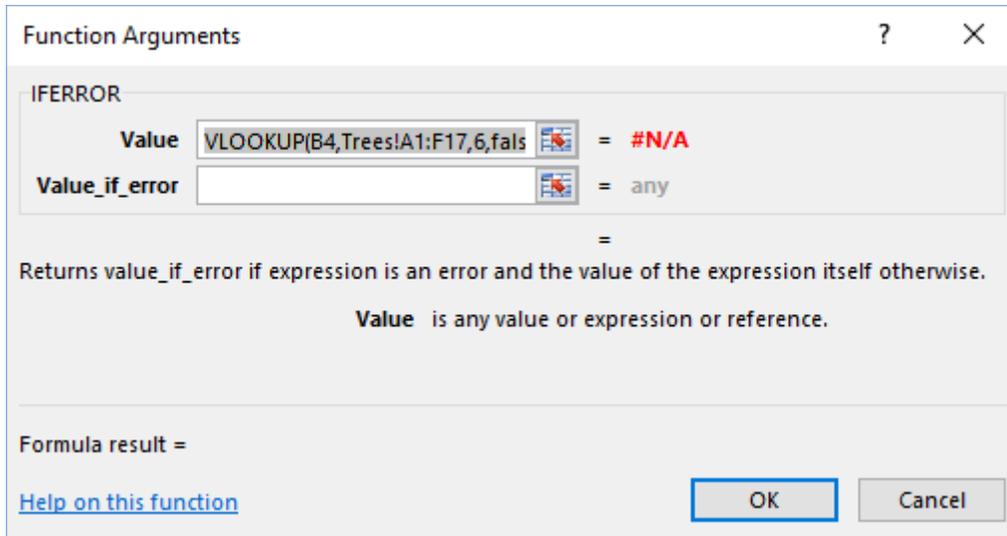


10. Click **OK**

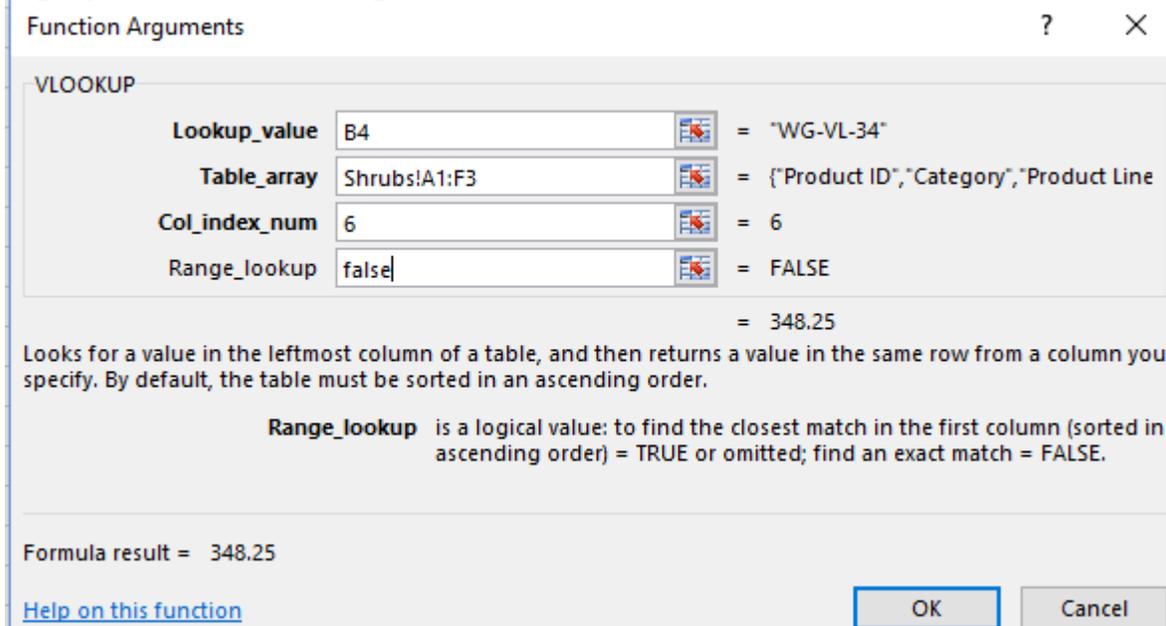
11. Go up to the *formula bar* area and click **in** the **IFERROR** formula **on** the word

**IFERROR**, which is the first part of the formula, and then click on the  icon – this will open the IFERROR dialog box back up.

***This is very important- if you do not click on the function IFERROR in the formula bar, then the original IFERROR function we created will not display.***



12. Click in *Value\_if\_error* section of the dialog box and then go to the *Name Box* and select **VLOOKUP**.
13. We are going to create the same **VLOOKUP** as we did in steps 5-8, only this time in the *Table\_array*, we are going to click on the *Shrubs* tab instead of *Trees*, and the range is slightly different. Your dialog box should look like the one below:



14. Click **OK**.

```
=IFERROR(VLOOKUP(B4,Trees!A1:F17,6,TRUE),VLOOKUP(B4,Shrubs!A1:F3,6,TRUE))
```

The way Excel reads this is: Find a match for B4 on the *Trees* sheet in the 6th column of the range A1.F17. If you cannot find a match, then see if you can find a match for B4 in the 6th column of the *Shrubs* sheet in range A1.F3.

You can find the formulas and some comments in `VLOOKUP_ACROSS_MULTIPLE_SHEETS_ANSWER.xlsx`.

## Review Exercise

– On Your Own- Create A VLOOKUP Across Multiple Sheets And Find Peyton Manning's Jersey Number.

If you want to practice a more complex calculation, open SPORTS\_VLOOKUP\_ACROSS\_MULTIPLE\_SHEETS.xlsx and see if you can use VLOOKUP and IFERROR to look up Peyton Manning's jersey number and Bobby Orr's number.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1																	
2																	
3																	
4	Try searching through 3 tables and finding Peyton Manning's Number								Try searching through 4 tables and find Bobby Orr's Number								
5																	
6	Name		Number										Name		Number		
7	P. Manning												B. Orr				
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15																	
16																	

Sheet1 Basketball Baseball Football Hockey

## **Review Questions – Section 4**

The review questions accompanying this course are designed to assist you in achieving the course learning objectives. The review section is not graded; do not submit it in place of your qualified assessment. While completing the review questions, it may be helpful to study any unfamiliar terms in the glossary in addition to course content. After completing the review questions, proceed to the review question answers and rationales.

5. To create a VLOOKUP across multiple sheets, incorporate the \_\_\_\_\_ function along with the VLOOKUP.
  - a. SUM
  - b. ISNA
  - c. IFERROR
  - d. CHOOSE

## Using VLOOKUP For Multiple Results VLOOKUP() and ROW() and COLUMN()

At times, you may want to display multiple results for whatever you are searching. For example, when I look up the part number in the database, I may also want to see the description, the quantity, and the cost of the part at the same time.

	A	B	C	D	E	F	G
1		Parta Number	Description	Location	Quantity		
2		D-178					
3							
4							
5							
6							
7							
8	Parts Database						
9		Number	Description	Location	Quantity	Cost	Retail
10		D-178	Gangley Pliers	Bin 4 - M	57	\$ 10.47	\$ 17.95
11		A-202	HCAB Washer	Bin 3 -O	856	\$ 0.12	\$ 0.25
12		C-098	Finley Sprocket	Bin 5 - O	357	\$ 1.57	\$ 2.95
13		B-111	6" Sonotube	Bin 8 -M	86	\$ 15.24	\$ 19.95
14		D-017	Langstrom 7" Wrench	Bin10 -M	75	\$ 18.69	\$ 27.95
15		C-321	Thompson Socket	Bin 6 -P	298	\$ 3.11	\$ 5.95
16		A-182	S-Joint	Bin 2 - M	155	\$ 6.85	\$ 9.95
17		B-047	LAMF Valve	Bin 20- V	482	\$ 4.01	\$ 6.95

We could do this by creating 3 separate **VLOOKUP** formulas, but that method is time consuming and prone to error if we later need to make changes.

Using the **COLUMN()** or the **ROW()** function inside of the **VLOOKUP** solves this problem. All you need to do is create the calculation once and then copy it.

### VLOOKUP and COLUMN

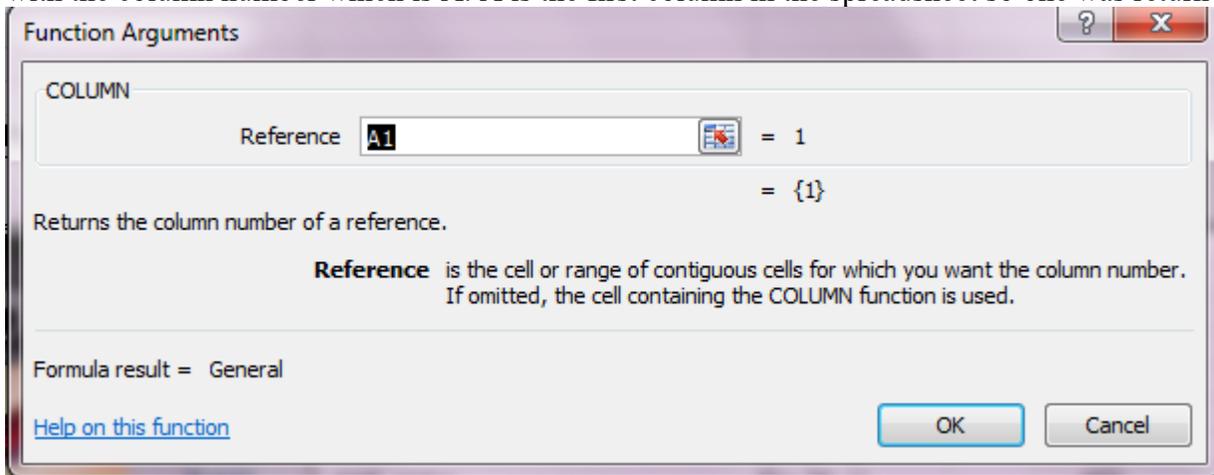
Let's use **VLOOKUP** and **COLUMN** to search and then display multiple results. In the example above, I want to create a formula that will display the Description, the Location, and the Quantity based upon whatever Part Number is displayed in cell **B2**. We could do a simple **VLOOKUP** in cell **C2** and it would look like this: **=VLOOKUP(B2,\$B\$10:\$G\$17,2,FALSE)**. However, we would have to create another **VLOOKUP** to get the Location, and create another one to get the Quantity. If I wanted the Location, the Quantity, Cost and other information, I could write several **VLOOKUP**s. The more you write and edit, the more chances of errors. So, we are going to nest the **COLUMN** function inside of the **VLOOKUP** function and then just copy it across.

The **COLUMN** function simply tells Excel what column it needs to go to.

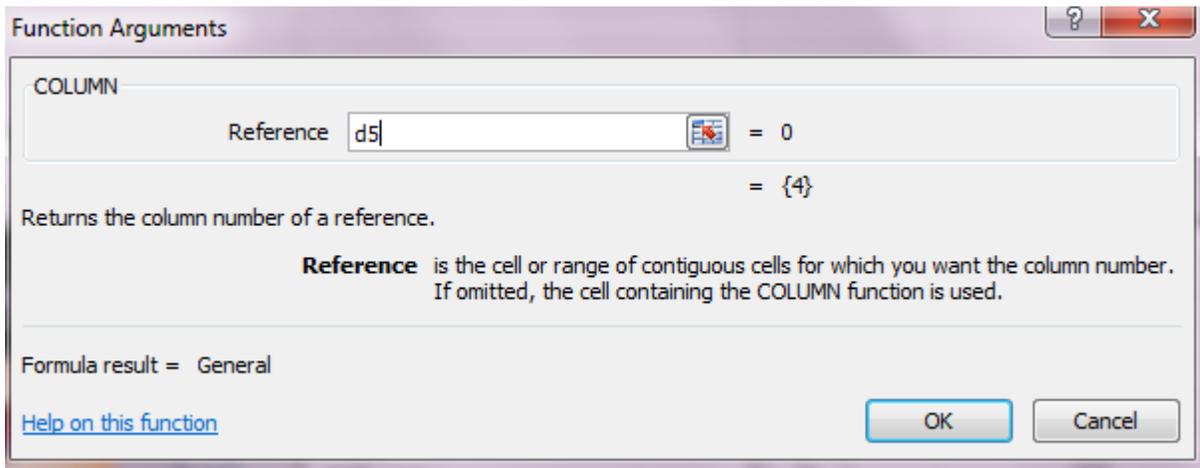
The syntax for **COLUMN** is simple albeit unhelpful. **=COLUMN(reference)**. Not too useful, is it? Let's walk through this.

In the screenshot below, I have **=COLUMN(A1)** and Excel has returned a result of one. If I had typed **=COLUMN(A20)** I would have also received the answer of one. Excel is only concerned

with the column number which is A. A is the first column in the spreadsheet so one was returned.



If I had typed `=COLUMN(D5)` the resulting answer would be \_\_\_? If you answered 4 then you have the right idea. D is the 4<sup>th</sup> column in the spreadsheet, so the answer would be 4 and it is shown in the screen shot below.



Hopefully you see where I am going with this and how it will work when we nest it in the **VLOOKUP**'s *Column index number* argument.

## LET'S TRY IT!

1. Open VLOOKUP-COLUMN.xlsx

I have a drop-down data validation already created for Part Number in cell **B2**.

	A	B	C	D	E	F	G
1		Part Number	Description	Location	Quantity		
2		D-178					
3							
4							
5							
6							
7							
8	<b>Parts Database</b>						
9		<b>Number</b>	<b>Description</b>	<b>Location</b>	<b>Quantity</b>	<b>Cost</b>	<b>Retail</b>
10		D-178	Gangley Pliers	Bin 4 - M	57	\$ 10.47	\$ 17.95
11		A-201	HCAB Washer	Bin 3 -O	856	\$ 0.12	\$ 0.25
12		C-098	Finley Sprocket	Bin 5 - O	357	\$ 1.57	\$ 2.95
13		B-111	6" Sonotube	Bin 8 -M	86	\$ 15.24	\$ 19.95
14		D-017	Langstrom 7" Wrench	Bin10 -M	75	\$ 18.69	\$ 27.95
15		C-321	Thompson Socket	Bin 6 -P	298	\$ 3.11	\$ 5.95
16		A-182	S-Joint	Bin 2 - M	155	\$ 6.85	\$ 9.95
17		B-047	LAMF Valve	Bin 20- V	482	\$ 4.01	\$ 6.95

We want to set up a **VLOOKUP** in Cell **C2** that will look at the part number displayed in *Column B* and retrieve the corresponding description from the parts database (lookup table). We are then going to copy that into **D2** to retrieve the location. We are going to do this using a **VLOOKUP** and **COLUMN** function nested together.

1. Click in cell **C2**.
2. Click the  icon on the Formula Bar.
3. Select the **VLOOKUP** function.
4. In the Lookup\_value type **\$B\$2** we are looking up the Part Number displayed in **B2**.
5. The Table\_array is **\$B\$10:\$G\$17**.
6. In the Col\_Index\_Num section type **COLUMN(B2)**.  
We are typing COLUMN(B2) rather than selecting the COLUMN function and then selecting B2 simply because it is faster this way.
7. In the Range Lookup type, **FALSE**.
8. Click **OK**.



You should see that you now have a description that matches the Part Number displayed in **B2**.

9. Copy the formula across to **D2** and you should see the Location display. If you have an error, please make sure the Lookup Value is **\$B\$2**. If you forgot to make it an absolute cell reference when you copied it, Excel is now looking at C2 instead of B2. The Table\_array also needs to be an absolute reference or a range name.

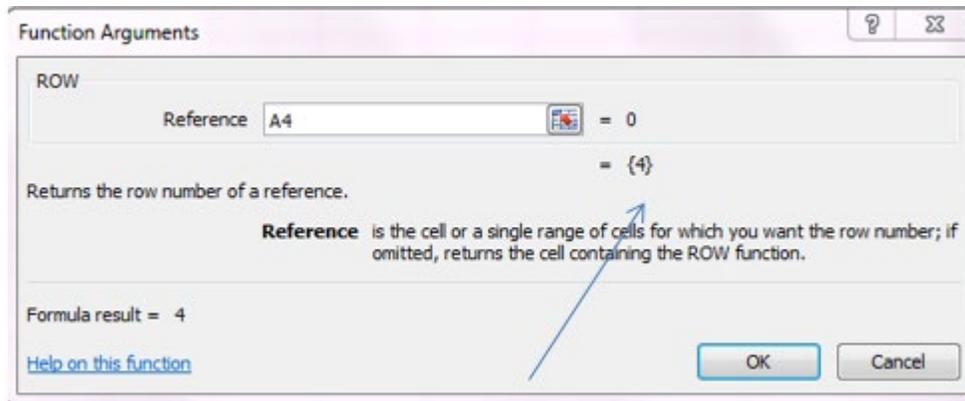
Now the big question. We said **COLUMN** counted the columns, so Description is in Column C – the third column- so why did we type Columnn(B2) instead of COLUMN(C2)? The key is the Table\_array – we didn’t start with Column A. Instead we started with Column B as the beginning of the table array, so Excel starts counting from there. Make sense?

### VLOOKUP And ROW

Now, that you understand how **COLUMN** works, the **ROW** function is a breeze as it works basically the same but allows you to lay your results out row-wise rather than column-wise. This example is very similar to the previous one – the only difference is that we want to use **ROW** instead of **COLUMN**, as we want our results to display in C2 and C3 instead of in C2 and D2, (I dropped Quantity from this example).

	A	B	C
1	Part Number		B-111
2	Description		
3	Location		

The **ROW** function simply tells Excel what row it needs to go to. The syntax for **ROW** is simple. **=ROW([reference])**. That is about as helpful as **=COLUMN([reference])** isn't it? In the screenshot below, I have the **=ROW([A4])** and it returns an answer of 4.

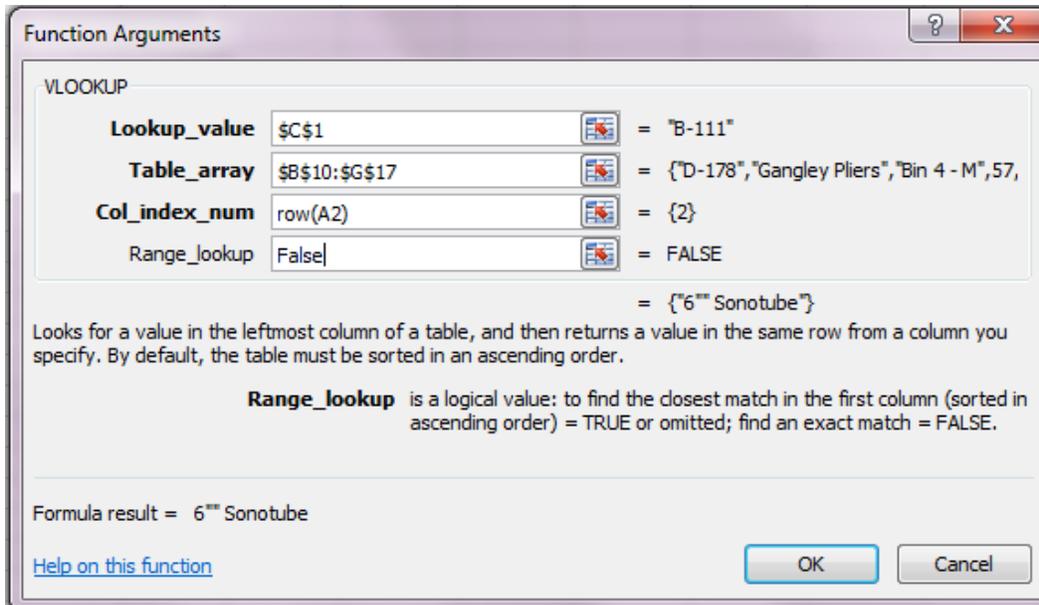


The screenshot is telling Excel to go to *Row 4*. If I had typed in **=ROW([B4])** or **=ROW([Z4])**, I would have received the same answer, as Excel just ignores the column identifier since it is only concerned with what row it is on. It's an Excel convention since you refer to everything with a column and a row identifier.

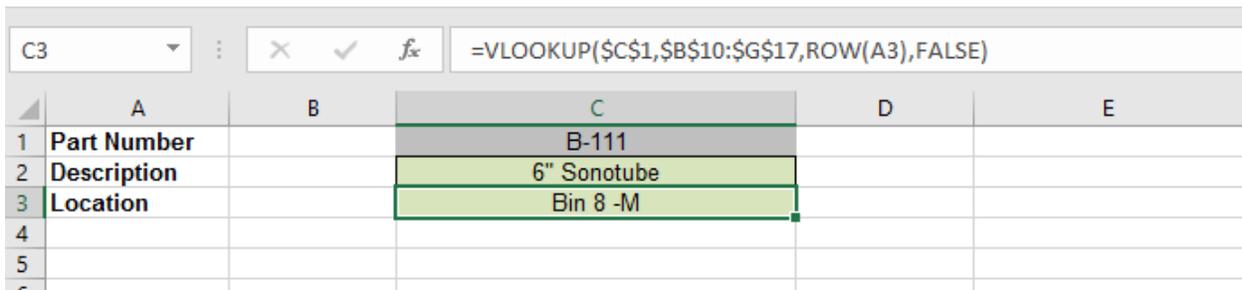
### LET'S TRY IT!

Use VLOOKUP and ROW together to multiple results.

1. Open VLOOKUP\_ROW.xlsx.
2. Click in cell C2.
3. Select the **VLOOKUP** function from the  icon.
4. In the Lookup\_value type **\$C\$1** as we are looking up the Part Number which is displayed in C1.
5. The Table\_array is **\$B\$10:\$G\$17**.  
*Table\_array remains unchanged – it is the same as last exercise.*
6. In the Col\_Index\_Num section type **ROW(A2)**.  
Again, it is simpler and faster to type this in then to go and retrieve the ROW function, and then type in A2, however you can do that if you wish.  
  
*=ROW(A2) = 2 tells Excel to go to the second column in the table.*
7. In the Range\_lookup type **FALSE**.



8. Click **OK**.  
You should see that you now have a description that matches the Part Number displayed in C1.
9. **Copy** the formula down to **C3** and you should see the Location display.



If you have an error, please make sure that the `Lookup_value` is either `$C$1` or `C$1`. If you forgot to make it an absolute cell reference when you copied it, Excel is now looking at C2 instead of C1. The next sheet in the file is the answer sheet, in case you want to compare your answer.

**Tip:** The F4 key cycles you through the absolute and relative cell reference options.

If we wanted to have Part Number, Description and Quantity display, instead of Part Number, Description, Location, then we could not have copied it to **C3**, as copying would have picked up Location. If you did copy it, then you would have had to manually adjust it so that it picked up the correct cell references by changing **Row(A3)** to **Row(A4)**.

### Review Exercise

*On Your Own - Create A Data Validation Drop-Down List of Employees' Names And Then Find Their Respective Departments And Extensions.*

1. Open REVIEW\_VLOOKUP\_ROW\_COLUMN.xlsx.
2. In cell **B1**, try creating a *Data validation drop-down* list to pick up the employee names found in Column P of the table of employee information.

		P	Q	R	S
		Name	Department	Extension	Office
		McCarthy	Marketing	6834	B-1-54
		Helstrom	Accounting	1283	A-1-23
		Sorrentino	Sales	5781	B-2-55
		Murphy	Accounting	1284	A-1-24
		Dupre	Finance	2587	A-3-41
1	Employee Name				
2	Department				
3	Extension				

If you do it correctly, you will have a drop-down arrow beside B1.

A	B	C
Employee Name	Murphy	

- In **B2**, retrieve the employee's department.  
Use **VLOOKUP** with the ROW function and copy it down to Extension in B3.

The answer is on the following sheet and should look similar to the screen shot below:

	A	B	C
1	Employee Name	Murphy	
2	Department	Accounting	
3	Extension	1284	

➔ If you want to play around with it, try step 3 with the Column function instead of ROW. In that case, you need to copy to C2.

### Drawback to VLOOKUP

What if I asked you to look up the Unit Price based on the Product name instead of Product ID? Could you do it? The answer is maybe, sometimes, or no – not with a **VLOOKUP**. How is that for a precise answer?

Product ID	Product Name	Quantity	Unit Price	Product ID	Category	Product Line	Type	Product Name	Size	Price
13 BG-CF-23	Bing Cherry		=VLOOKUP(F3,product_table,7,False)	CE-DB-BH	Décor	Birding	Bird House	Cottage Birdhouse		\$ 16.65
13 BH-SV-67	Silver Birch			HF-DB-BH	Décor	Birding	Bird Feeder	Hummingbird Feeder		\$ 34.95
13 BO-PF-45	Bosc Pear			FP-DB-BB	Décor	Birding	Bird Bath	Flower Petal Birdbath		\$ 18.95
14 CE-DB-BH	Cottage Birdhouse			DC-DF-DB	Décor	Furniture	Bench	Daisy Chain Bench		\$ 199.00
13 DC-DF-DB	Daisy Chain Bench			DC-DF-BS	Décor	Furniture	Bench	Daisy Chain Bistro Set		\$ 250.00
13 DC-DF-DB	Daisy Chain Bench							Paperback Maple	4-5Ft	\$ 24.95
13 GA-AF-45	Gala							Paperback Maple	6-7 Ft	\$ 39.95
13 ME-PB-89	Paper							Paperback Maple	8-9 Ft	\$ 69.95
13 WG-VL-34	Wine							Bloodgood Japanese Maple	4-5Ft	\$ 24.95
								Bloodgood Japanese Maple	6-7 Ft	\$ 39.95
								Bloodgood Japanese Maple	8-9 Ft	\$ 69.95
								Silver Birch	4-5Ft	\$ 24.95
								Silver Birch	6-7 Ft	\$ 39.95
								Silver Birch	8-9 Ft	\$ 69.95
								Bartlett Pear	4-5Ft	\$ 16.95
								Bartlett Pear	6-7 Ft	\$ 39.95
								Bartlett Pear	8-9 Ft	\$ 64.95
								Bosc Pear	4-5 Ft	\$ 16.95
								Bosc Pear	6-7 Ft	\$ 39.95
								Bosc Pear	8-9 Ft	\$ 64.95
								Bing Cherry	4-5 Ft	\$ 17.95

Function Arguments

VLOOKUP

Lookup\_value: F3 = "Bing Cherry"

Table\_array: product\_table = {"DC-DS-WF", "Décor", "Statuary", "Fount"

Col\_index\_num: 7 = 7

Range\_lookup: False = FALSE

Looks for a value in the leftmost column of a table, and then returns a value in the same row from a column you specify. By default, the table must be sorted in an ascending order.

Table\_array is a table of text, numbers, or logical values, in which data is retrieved. Table\_array can be a reference to a range or a range name.

Formula result =

[Click on this function](#)

OK Cancel

I put all the information into the **VLOOKUP** Function Argument, but notice that Excel does not provide an answer. Any guesses as to why not? Earlier, I mentioned that Excel assumes that the leftmost column is sorted. Are you ready to guess now after that hint? Okay, you guessed it. The **VLOOKUP** automatically looks in the first column of the table and assumes it will find a match there. In the screenshot above it is trying to match the words Bing Cherry with a Product ID number, and there is nothing that matches. If the first column in the table had been Product Name, then it would have found a match, but not necessarily the one we wanted. As you can see, there are multiple products with the same name. In this case, *maybe* might be the answer to the question.

There are workarounds if the first column of your table does not match what you are looking for. The easiest way is to either move columns around in the lookup table, or in this case, just change the table so that instead of starting at column K, it starts at Column O.

Product ID	Product Name	Quantity	Unit Price	Product ID	Category	Product Line	Type	Product Name	Size	Price
BG-CF-23	Bing Cherry		=VLOOKUP(F3,\$O\$3:\$Q\$30,3,false)	DC-DS-WF	Décor	Statuary	Fountain	Daisy Chain Water Fountain		\$ 79.50
BH-SV-67	Silver Birch			CE-DB-BH	Décor	Birding	Bird House	Cottage Birdhouse		\$ 16.65
BO-PF-45	Bosc Pear			HF-DB-BH	Décor	Birding	Bird Feeder	Hummingbird Feeder		\$ 34.95
CE-DB-BH	Cottage Birdhouse			FP-DB-BB	Décor	Birding	Bird Bath	Flower Petal Birdbath		\$ 18.95
DC-DF-DB	Daisy Chain Bench			DC-DF-DB	Décor	Furniture	Bench	Daisy Chain Bench		\$199.00
DC-DF-DB	Daisy Chain Bistro Set							Daisy Chain Bistro Set		\$250.00
GA-AF-45	Paperback Maple							Paperback Maple	4-5Ft	\$ 24.95
ME-PB-89	Paperback Maple							Paperback Maple	6-7 Ft	\$ 39.95
WG-VL-34	Paperback Maple							Paperback Maple	8-9 Ft	\$ 69.95
	Bloodgood Japanese Maple							Bloodgood Japanese Maple	4-5Ft	\$ 24.95
	Bloodgood Japanese Maple							Bloodgood Japanese Maple	6-7 Ft	\$ 39.95
	Bloodgood Japanese Maple							Bloodgood Japanese Maple	8-9 Ft	\$ 69.95
	Silver Birch							Silver Birch	4-5Ft	\$ 24.95
	Silver Birch							Silver Birch	6-7 Ft	\$ 39.95
	Silver Birch							Silver Birch	8-9 Ft	\$ 69.95
	Bartlett Pear							Bartlett Pear	4-5Ft	\$ 16.95
	Bartlett Pear							Bartlett Pear	6-7 Ft	\$ 39.95
	Bartlett Pear							Bartlett Pear	8-9 Ft	\$ 64.95
	Bosc Pear							Bosc Pear	4-5 Ft	\$ 16.95
	Bosc Pear							Bosc Pear	6-7 Ft	\$ 39.95
	Bosc Pear							Bosc Pear	8-9 Ft	\$ 64.95
	Bing Cherry							Bing Cherry	4-5 Ft	\$ 17.95

Function Arguments

VLOOKUP

Lookup\_value: F3 = "Bing Cherry"

Table\_array: \$O\$3:\$Q\$30 = {"Daisy Chain Water Fountain",0,79.5;"Cottage Birdhouse",0,16.65;"Hummingbird Feeder",0,34.95;"Flower Petal Birdbath",0,18.95;"Daisy Chain Bench",0,199;"Daisy Chain Bistro Set",0,250;"Paperback Maple",4-5Ft,24.95;"Paperback Maple",6-7 Ft,39.95;"Paperback Maple",8-9 Ft,69.95;"Bloodgood Japanese Maple",4-5Ft,24.95;"Bloodgood Japanese Maple",6-7 Ft,39.95;"Bloodgood Japanese Maple",8-9 Ft,69.95;"Silver Birch",4-5Ft,24.95;"Silver Birch",6-7 Ft,39.95;"Silver Birch",8-9 Ft,69.95;"Bartlett Pear",4-5Ft,16.95;"Bartlett Pear",6-7 Ft,39.95;"Bartlett Pear",8-9 Ft,64.95;"Bosc Pear",4-5 Ft,16.95;"Bosc Pear",6-7 Ft,39.95;"Bosc Pear",8-9 Ft,64.95;"Bing Cherry",4-5 Ft,17.95}

Col\_index\_num: 3 = 3

Range\_lookup: false = FALSE

Formula result = 17.95

OK Cancel

In the example above, it looks down Column O, which is the first column in the table array, and then it looks over 3 columns to retrieve the price.

### Drawbacks

The drawback to the **VLOOKUP** is two-fold. The first column of the lookup table must contain what you are looking for, and to find the answer **VLOOKUP** only looks to the right. In other words, if Price had been in Column M or N, then once it matched the Product Name in Column O, it cannot look left.

As I wrote earlier, people usually shuffle the columns around, or in our case, just select a different portion of the table. However, if your spreadsheet is complex, or you are linking over to someone else’s files, you may not have this luxury.

The fix is a bit complicated but it works. It requires combining the **CHOOSE** function and the **VLOOKUP** together. First, let’s look at the **CHOOSE** function by itself.

**XLOOKUP** is a new Excel function that is still in beta at the moment; however, this function will alleviate some of the issues with Vlookup as it includes a Lookup\_array in the function syntax that allows you to identify the lookup column range so the order will not matter. We will discuss this a bit more , in a later section of the EBook, but I wanted to point it out. So, if this function is available to you then you may want to jump to that section.

## CHOOSE Function

The **CHOOSE** function is also in the *Lookup and Reference* category. It returns the values from an existing list. One common application for **CHOOSE ()** is to calculate weighted questionnaire responses or to use it to select a discount or tax rate. Another application is to integrate it with worksheet option buttons.

The syntax is **=CHOOSE(Index\_number, Value1, Value2,...Value254)**.

It looks at the index number and then searches for a match in the list.

It works simply. =CHOOSE(3, 10,15,20,25,30) = 20.

Since the Index Number is 3, CHOOSE selected the 3<sup>rd</sup> value in the list, which was 20. See, I told you it was simple.

Here is an easy example for using **CHOOSE()** as a lookup function, all on its own, so you can see how it works. After that, we will create an example and use **VLOOKUP** and **CHOOSE** together.

In the example below, I want to look up and assign a tax rate based upon the filing status shown in Column D. The tax rates are typed directly into the **CHOOSE()** function syntax.

**=CHOOSE(D4,0.15,0.25,0.28,0.33,0.35)**

We are telling Excel to look at **D4** and then find that corresponding number in the list. Cell **D4** has a filing status of 4, so Excel goes to the 4<sup>th</sup> item in the list, which is 0.33, and returns it. If we copy the formula down to row 5, Excel would see that Paine has a filing status of 2 and would return the 2<sup>nd</sup> number in the list, which is 0.25.

	A	B	C	D	E	F	G
1							
2							
3			Salary	Filing Stat	Tax Rate		
4		Adams	300,000	4	0.33		
5		Paine	73,000	2			
6		Hamilton	485,000	5			
7		Shays	18,000	1			
8		Pitcher	23,000	1			
9		Madison	147,000	3			

## CHOOSE VS VLOOKUP

Let's briefly look at how the **CHOOSE** and **VLOOKUP** functions compare in this example.

### CHOOSE()

The formula using CHOOSE is: =CHOOSE(D4,0.15,0.25,0.28,0.33,0.35)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1														
2		Using Choose, find the Tax Rate for Column E											Lookup Table Information	
3			Salary	Filing Stat	Tax Rate								Filing Status	Tax Rate
4		Adams	300,000	4	33%								1	15%
5		Paine	73,000	2	25%								2	25%
6		Hamilton	485,000	5	35%								3	28%
7		Shays	18,000	1	15%								4	33%
8		Pitcher	23,000	1	15%								5	35%
9		Madison	147,000	3	28%									

The advantages of using **CHOOSE** this way are:

- you don't have to worry about absolute cell references
- you don't need to create a lookup table

The disadvantages of using **CHOOSE** are:

- You have to type in all the values into the argument
- You are limited to 254 values in the **list**

### VLOOKUP()

If we had used a VLOOKUP, we would have created a lookup table such as the one in column M and N, and the formula would have been =VLOOKUP(D4,\$M\$4:\$N\$8,2, False)

An alternative solution for **CHOOSE** would be =CHOOSE(D4,\$N\$4,\$N\$5,\$N\$6,\$N\$7,\$N\$8). However, this requires the use of a column of information and absolute cell references. It is more work than using the **VLOOKUP**, since you had to type in each value instead of just using a table\_array.

### VLOOKUP Searching In A Different Column For A Match

Unless you are using a short and simple lookup, **VLOOKUP** would typically be selected over **CHOOSE**. So, why did we look at **CHOOSE**?

I did have a reason – honest. The major disadvantage of the **VLOOKUP** is that you must look down the first leftmost column to find the match, which can be difficult since you may have to move columns all around to accommodate it. However, by combining the **VLOOKUP** and **CHOOSE** together, you can trick Excel into selecting a different column for the **VLOOKUP**. Now that you understand how **CHOOSE** works, let's incorporate it into a **VLOOKUP** where the column we want to look in is not the leftmost column.

### LET'S TRY IT!

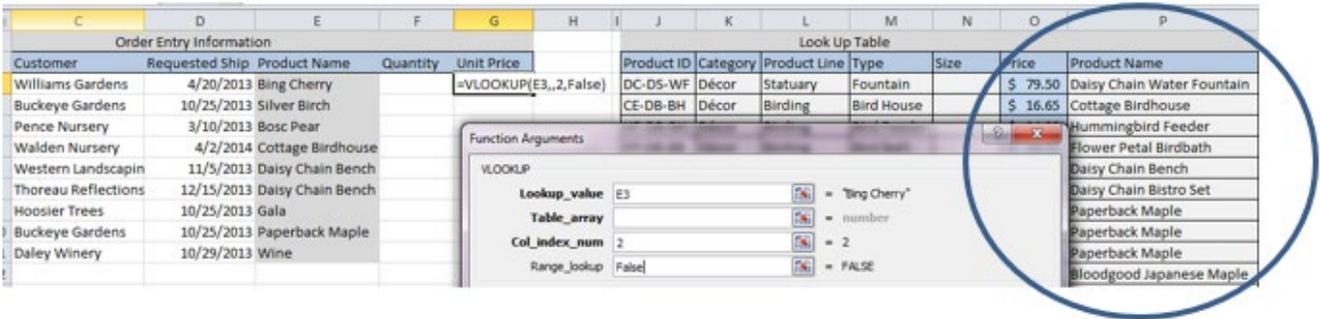
We want to determine the price for each product based upon the Product Name. This is a little more complicated because we want Excel to look at multiple index numbers rather than just one.



To do this we need to create an array, which is just a block of contiguous cells that Excel treats as a single unit.

1. Click on the *VLOOKUP & Choose sheet* in the *VLOOKUP\_and\_CHOOSSE.xlsx* file.  
The data is similar to what we used in past exercises –here it has been moved around a bit. This time we are going to search for *Unit Price* by *Product Name*, as there is no Product ID column in the order entry information.
2. Click in Cell **G3**.
3. Select the **VLOOKUP** function from the  icon.

We are going to enter the **VLOOKUP** components first since we are already familiar with them. Enter the information as shown in the screenshot below:



- Enter **E3** as the *Lookup\_value* – it currently displays as Bing Cherry.
- We are only going to have 2 columns, Price and Product Name, so we are going to put a **2** in *Col\_index\_num* since we are telling Excel that Product Name is the first column in the table.
- Since we want exact matches, and the data may not be sorted, we are including **FALSE** in the *Range\_lookup*.

Now for the interesting part. **VLOOKUP** only looks in the *first* column of the table, but in this case, Product Name is not the first column in the table – it is the last column. We can't change the table array since Price is to the left of Product Name. Remember- **VLOOKUP** assumes the column it is going to match is the first column in the table, and then it looks to the right to find the corresponding data. In this case, Price is to the left of Product Name, so we will trick Excel by using the **CHOOSE** function inside of the **VLOOKUP**.

The table array component is going to read:

**CHOOSE({1,2},\$P\$3:\$P\$30,\$O\$3:\$O\$30)**

Let's start at the back. We are telling Excel that we have 2 columns, Column P and Column O, and the specific cells in those columns are from 3 to 30.

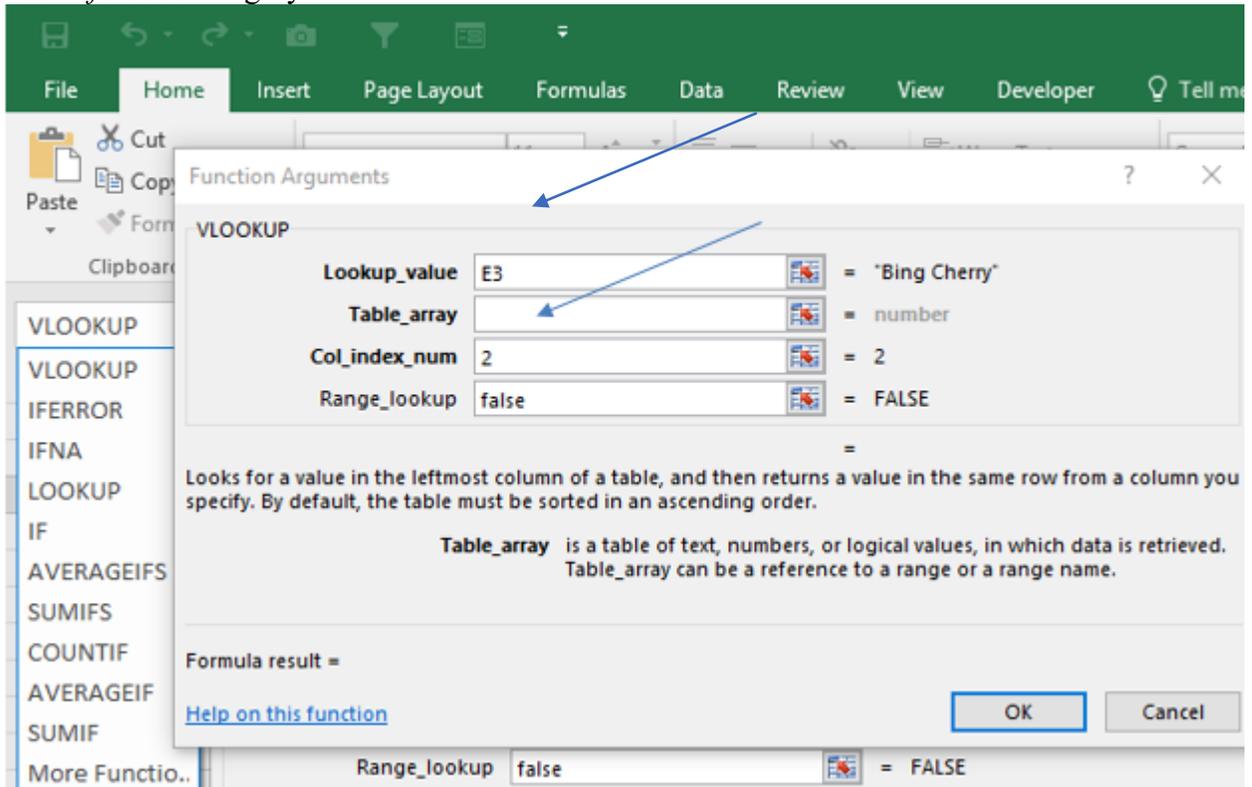
Now, let's look at the beginning. The 1,2 is telling Excel that we have two columns, P and O, and that Excel needs to look at the first column.

The funny brackets around the 1 and the 2 tell Excel that this is an array. An array is a contiguous range of cells that are considered a block of cells that cannot be separated.

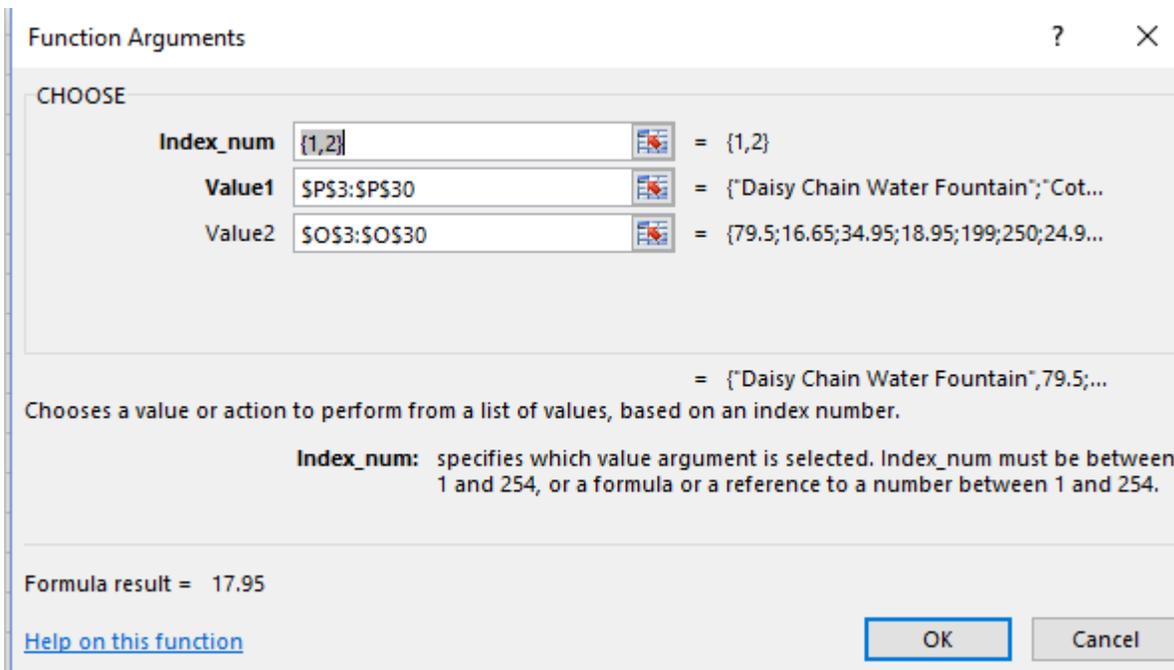
Okay, let's put it all together.

1. Click in Table\_array in the existing **VLOOKUP** dialog box.

- Click on the drop-down arrow beside the *Name Box* and select the **CHOOSE** function. If **CHOOSE** is not visible, click *More Functions* and search for **CHOOSE** in the *Lookup and Reference* category.



A CHOOSE dialog box should appear. If you look at the formula bar, you will see that the **VLOOKUP** has now incorporated the **CHOOSE** function.



3. Enter {1,2} in Index\_num type. The brackets tell Excel that this is an array. An array, in Excel, means that the cells all belong together and are treated as a contiguous block of related information.
4. Enter \$P\$3:\$P\$30 in Value1.
5. Enter \$O\$3:\$O\$30 in Value2.
6. Click OK.

This is the actual formula that should display in the formula bar.  
 =VLOOKUP(E3,CHOOSE({1,2},\$P\$3:\$P\$30,\$O\$3:\$O\$30),2,FALSE).

7. Copy the formula down.

We are telling Excel to look at cell E3, which is displaying Bing Cherry, and then to go to Column P, which is the first of our two columns, and find a match. Once it goes down Column P and finds a match, then it looks at the VLOOKUP Column\_Index and sees that it should go to the 2<sup>nd</sup> column in the table (Column O) and retrieve the associated price of \$17.95.

Make sense?

Order Entry Information					Look Up Table									
Customer	Requested Ship	Product Name	Quantity	Unit Price	Product ID	Category	Product Line	Type	Size	Price	Product Name			
Williams Gardens	4/20/2013	Bing Cherry		17.95	DC-DS-WF	Décor	Statuary	Fountain		\$ 79.50	Daisy Chain Water Fountain			
Buckeye Gardens	10/25/2013	Silver Birch		24.95	CE-DB-BH	Décor	Birding	Bird House		\$ 16.65	Cottage Birdhouse			
Pence Nursery	3/10/2013	Bosc Pear		16.95	HF-DB-BH	Décor	Birding	Bird Feeder		\$ 34.95	Hummingbird Feeder			
Walden Nursery	4/2/2014	Cottage Birdhouse		16.65	FP-DB-BH	Décor	Birding	Bird Bath		\$ 18.95	Flower Petal Birdbath			
Western Landscapin	11/5/2013	Daisy Chain Bench		199	DC-DF-DB	Décor	Furniture	Bench		\$ 199.00	Daisy Chain Bench			
Thoreau Reflections	12/15/2013	Daisy Chain Bench		199	DC-DF-BS	Décor	Furniture	Bench		\$ 250.00	Daisy Chain Bistro Set			
Hoosier Trees	10/25/2013	Gala		15.95	ME-PB-45	Tree	Ornamental	Maple	4-5Ft	\$ 24.95	Paperback Maple			
Buckeye Gardens	10/25/2013	Paperback Maple		24.95	ME-PB-67	Tree	Ornamental	Maple	6-7 Ft	\$ 39.95	Paperback Maple			
Daley Winery	10/29/2013	Wine		9.95	ME-PB-89	Tree	Ornamental	Maple	8-9 Ft	\$ 69.95	Paperback Maple			
					ME-BJ-45	Tree	Ornamental	Maple	4-5Ft	\$ 24.95	Bloodgood Japanese Maple			
					ME-BJ-67	Tree	Ornamental	Maple	6-7 Ft	\$ 39.95	Bloodgood Japanese Maple			
					ME-BJ-89	Tree	Ornamental	Maple	8-9 Ft	\$ 69.95	Bloodgood Japanese Maple			
					BH-SV-45	Tree	Ornamental	Birch	4-5Ft	\$ 24.95	Silver Birch			
					BH-SV-67	Tree	Ornamental	Birch	6-7 Ft	\$ 39.95	Silver Birch			
					BH-SV-89	Tree	Ornamental	Birch	8-9 Ft	\$ 69.95	Silver Birch			

I want you to look at Column E and G and see if you notice anything important.

What I wanted you to notice is that Silver Birch, Row 4, has a price of \$24.95. If you look through the lookup table, you will see Silver Birch has multiple price points depending upon the size of the tree. Excel selects the first one that it finds and then stops. If you look at the Daisy Chain Bench and Paperback Maple, you will see the same thing. Using a product number, instead of a general product description that is specific to the individual product, is always a better choice. In databases, Employee Id, or social security number, is used rather than the employee's last name.

### Review Exercise

On Your Own -Use VLOOKUP And CHOOSE To Find The Customer's Salesperson.

1. Open VLOOKUP\_and\_CHOOSExlsx and select the sheet VLOOKUP& Choose Review.
2. In cell K2, we want to find who the salesperson is for the Customer in cell K1.

Salesperson	State	Customer	Requested Ship	Product ID
Daniels	OH	Buckeye Garden	10/25/2013	ME-PB-89
Daniels	OH	Buckeye Garden	10/25/2013	BH-SV-67

To accomplish this, you need to use VLOOKUP and CHOOSE as the Customer is not the first column in the table.

In some cases, it is easier and faster to just move Column C and make it the first column, but if you are linking to someone else's worksheet you may not have that option. Also, if your worksheet is complex and large, you don't want to be moving columns around since that is asking for an error down the road. Don't worry if you frequently face this situation. There are other lookup functions that may work better for you, and we will be getting to them shortly.

### CHOOSE And SUM

As mentioned earlier, **CHOOSE**, by itself, doesn't seem to be that useful but it becomes more useful when combined with other functions. For example, you can use it with **SUM**. In the screenshot below, I have two columns of numbers. By changing the Index Number in the **CHOOSE** function, I can have it sum a different cell range.

	A	B	C	D	E	F	G
1				150			
2							
3	10	5					
4	20	10					
5	30	15					
6	40	20					
7	50	25					

The calculation was **=SUM(CHOOSE(1,A3:A7,B3:B7))** which caused Excel to add and sum the first column in my list. If I changed the calculation to **SUM(CHOOSE(2,A3:A7,B3:B7))** the answer would be 75, which is the total of B3:B7. You could do this with any number of columns.

Below is an example of how you might want to set something up using **SUM** and **CHOOSE**. In the screenshot, I want to sum the sales for whatever region I specify in **Column H**. Region 1 would be Column A, Region 2 would be Column B etc.

	A	B	C	D	E	F	G	H
1							Region:	3
2	East (1)	West (2)	North (3)	South (4)			Sales	15
3	\$ 10.0	\$ 5.0	\$ 1.0	\$ 2.0				
4	\$ 20.0	\$ 10.0	\$ 2.0	\$ 4.0				
5	\$ 30.0	\$ 15.0	\$ 3.0	\$ 6.0				
6	\$ 40.0	\$ 20.0	\$ 4.0	\$ 8.0				
7	\$ 50.0	\$ 25.0	\$ 5.0	\$ 10.0				

### Review Exercise

On Your Own- Use **CHOOSE** And **SUM** To Add Up Sales For The Specified Region.

1. Open **CHOOSE\_and\_SUM.xlsx** On Sheet 1, sum the sales for the region displayed in **H1**.

The answer sheet is also in the file but I have displayed the formula below as well.

	A	B	C	D	E	F	G	H
1							Region:	3
2	East (1)	West (2)	North (3)	South (4)			Sales	15
3	\$ 10.0	\$ 5.0	\$ 1.0	\$ 2.0				
4	\$ 20.0	\$ 10.0	\$ 2.0	\$ 4.0				

### HLOOKUP Function

**HLOOKUP** is essentially the same function as **VLOOKUP** except it looks up data that has been formatted by rows instead of columns. The **V** in **VLOOKUP** is for vertical looking in columns. **HLOOKUP** is for horizontal looking across rows of data.

**HLOOKUP** tends to be used infrequently because most people design their spreadsheets vertically.; However, it may come in handy at some point, so we are going to take a quick look at it.

The syntax for **HLOOKUP** is: **=HLOOKUP (lookup value, table\_array, col\_index\_number, range\_lookup, False)**

<b>Lookup value</b>	The cell you want Excel to lookup or match.
<b>Table_array</b>	The location (range of cells) of your lookup table.
<b>Row_index_Num</b>	The row number in the lookup range that has the data you are seeking.
<b>Range_lookup</b>	If you use False, and there is not an exact match, a value is not returned. Use true or blank if you don't need an exact match.

The *Column\_index\_Num* has been replaced by the *Row\_index\_num*- other than that, the syntax is exactly the same as a **VLOOKUP**. Does this remind you a bit of **COLUMN()** and **ROW()**? It should. The **VLOOKUP** looked in columns whereas the **HLOOKUP** looks in rows.

Function Arguments

? X

**HLOOKUP**

**Lookup\_value**  = any  
**Table\_array**  = number  
**Row\_index\_num**  = number  
**Range\_lookup**  = logical

=

Looks for a value in the top row of a table or array of values and returns the value in the same column from a row you specify.

**Lookup\_value** is the value to be found in the first row of the table and can be a value, a reference, or a text string.

---

Formula result =

[Help on this function](#) OK Cancel

Let's look at the screen shot below and break it apart. We want to find the total amount for March and have it display in cell **B2**.

GL Account	Description	Line #	January	February	March	April	May	June
100-00-1000	Cash-Bank-1	1	\$ 250,000.00	\$ 255,000.00	\$ 260,100.00	\$ 265,302.00	\$ 270,608.04	\$ 276,020.20
100-02-1000	Cash-Bank2	1	\$ 54,875.00	\$ 53,228.75	\$ 51,631.89	\$ 50,082.93	\$ 48,580.44	\$ 49,123.00
100-03-1000	Cash-Bank 3	1	\$ 22,156.00	\$ 22,488.34	\$ 22,825.67	\$ 23,168.05	\$ 23,515.57	\$ 23,868.30
100-04-1000	Petty Cash	1	\$ 5,000.00	\$ 5,000.00	\$ 4,850.00	\$ 4,704.50	\$ 4,563.37	\$ 5,000.00
100-10-1000	Accounts Receivable	2	\$ 1,853,755.00	\$ 1,872,292.55	\$ 1,891,018.48	\$ 1,909,925.63	\$ 1,929,024.89	\$ 1,948,315.14
100-10-1001	Accounts Receivable Interest Accrual	2	\$ 27,650.00	\$ 28,479.50	\$ 29,333.89	\$ 30,213.90	\$ 31,120.32	\$ 32,053.93
<b>Total</b>	<b>Total - Account 100</b>		<b>\$ 2,213,436.00</b>	<b>\$ 2,236,489.14</b>	<b>\$ 2,259,756.91</b>	<b>\$ 2,283,397.01</b>	<b>\$ 2,307,412.62</b>	<b>\$ 2,334,380.57</b>

Using the example above we know the following:

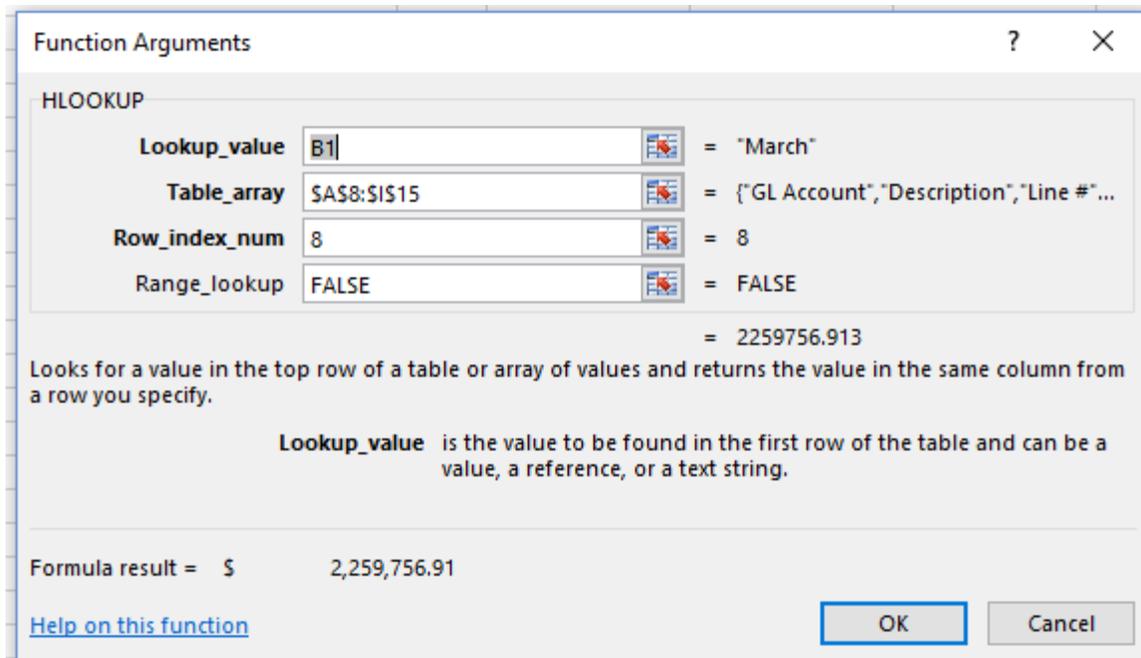
Lookup_value	Cell B1	We want to look up March.
Table_array	\$A\$8:\$I\$15	The lookup table containing the information we are looking for is in A9 through I15. I used \$ for absolute cell references, just in case we set this up to copy the formula.
Row_index_num	8	The data we want is in Row 15, which is the 8th <sup>th</sup> row in the table = Total.
Range_lookup	False	If your data is not sorted, you must enter False or you may get an incorrect answer. Even if data is sorted, if there is not an exact match, Excel will find the next closest value.

**HLOOKUP** is very picky and requires that the table\_array include the headings. If **HLOOKUP** can't find lookup\_value, and range\_lookup is TRUE, it uses the largest value that is less than lookup\_value. If lookup\_value is smaller than the smallest value in the first row of table\_array, HLOOKUP returns the #N/A error value.

### Review Exercise

On Your Own- Use HLOOKUP To Look Up The Total Of Account 100 In March.

1. Open **HLOOKUP**.xlxs.
2. Create a HLOOKUP in cell **B2** to look up the *Total of Account 100* in *March*.



There is an answer file in the Excel workbook if you want to compare.

## **Review Questions – Section 5**

The review questions accompanying this course are designed to assist you in achieving the course learning objectives. The review section is not graded; do not submit it in place of your qualified assessment. While completing the review questions, it may be helpful to study any unfamiliar terms in the glossary in addition to course content. After completing the review questions, proceed to the review question answers and rationales.

6. In Hlookup.xlsx, if you want to look up the March petty cash amount of \$4850, what would the row\_index\_number be if the array starts at Row 8?
  - a. 5
  - b. 4
  - c. 7
  - d. 12

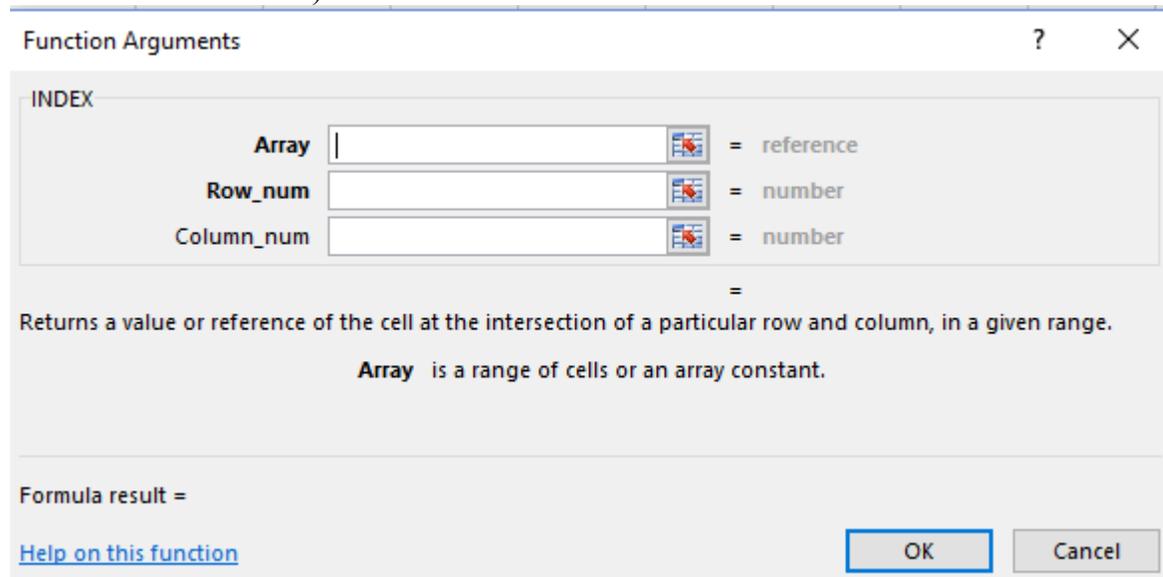


## INDEX And MATCH

With **INDEX MATCH**, you can automate invoices and develop reports from a variety of different sources. Many people argue the merits of **INDEX MATCH** over **VLOOKUP**. A lot of people consider **INDEX MATCH** to be more powerful and versatile than a **VLOOKUP**, particularly if you are searching through a vast amount of data, due to the way it searches. However, analysis seems to question that assumption.<sup>2</sup>

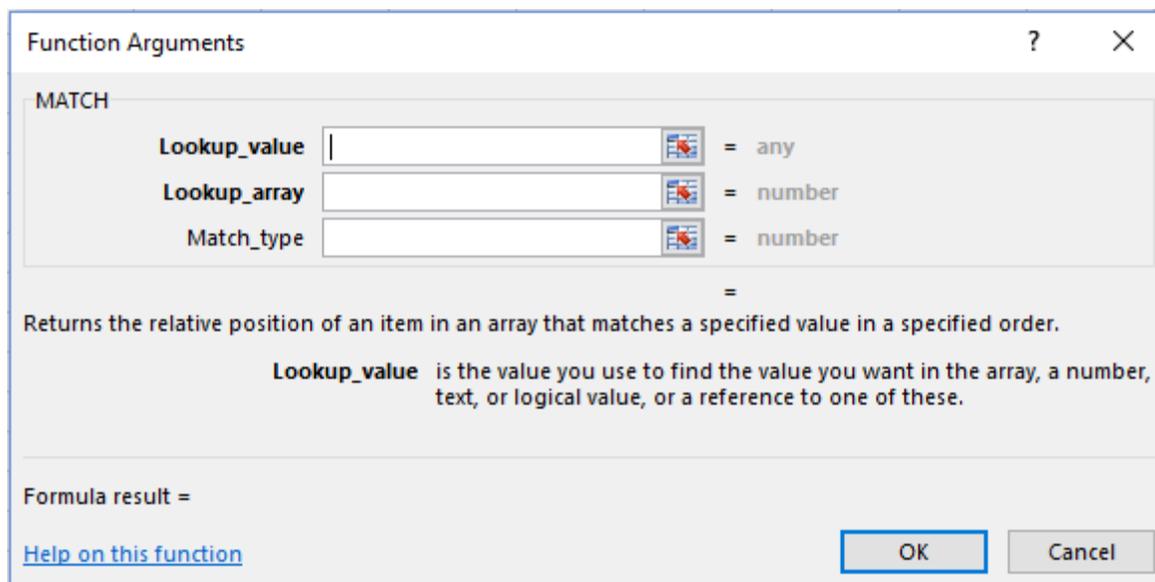
Others favor the **Index Match** since the lookup table does not need to be sorted, nor does the lookup value have to be the first column in the table. However, as we learned earlier, using **FALSE** negates the sort issue, and you can work around the first column issue. Personally, I always use **VLOOKUP** but my husband swears by **INDEX MATCH**, and he refuses to use **VLOOKUP**. Personal preference I guess. It can also depend on how your data is set up.

The **INDEX MATCH** is a formula that combines two separate functions – **INDEX** and **MATCH**. Individually, you would wonder how to use them, but together they are a great combination. **INDEX** returns a value, or the reference to a value, from within a table or range. The array version of the **INDEX** function always returns a value or an array of values (this is the version that we will use).



The **MATCH** function looks for a specific value in a single column or row, and it returns a number that indicates that value's position in the list. The **MATCH** function should look a little familiar to you with its **Lookup\_value** and **Lookup\_array** arguments.

<sup>2</sup> <http://www.excelguru.ca/forums/showthread.php?132-INDEX-MATCH-versus-VLOOKUP>



The Match type can be a 0,1, or -1.

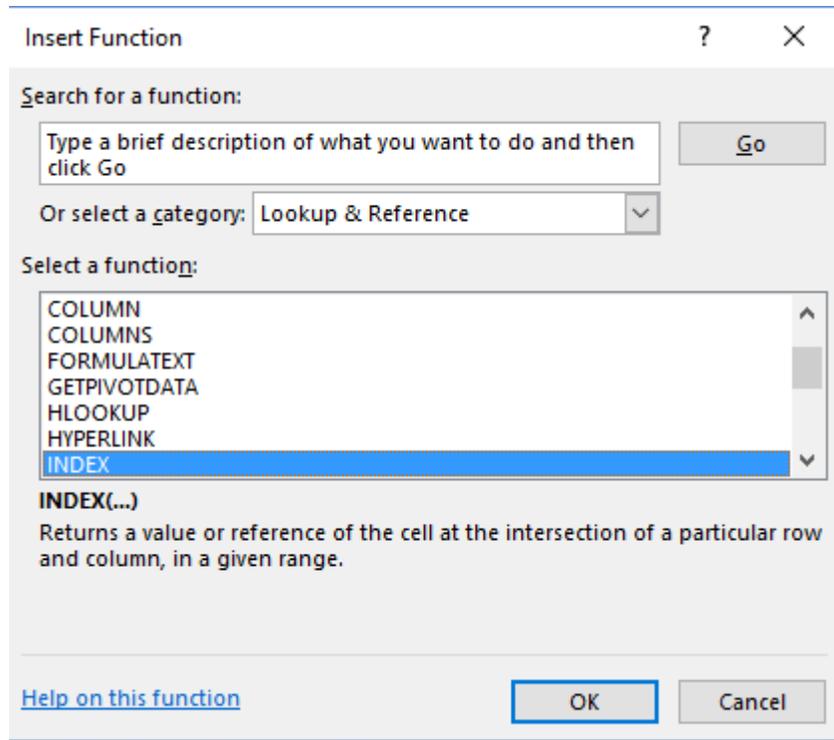
- 0 indicates an exact match or N/A if the exact match not found
- 1 searches for the largest value less than or equal to the lookup value - must be sorted in ascending order. ***1 is the default***
- 1 searches for the smallest value greater than or equal to the lookup value - must be in descending order.

Doesn't sound like much, does it? To be honest, you really need to use the functions together to see how they work as it is difficult to visualize. However, they can be very useful. Basically, it is a more flexible **VLOOKUP**, but it requires combining two different functions. Let's go through an example together.

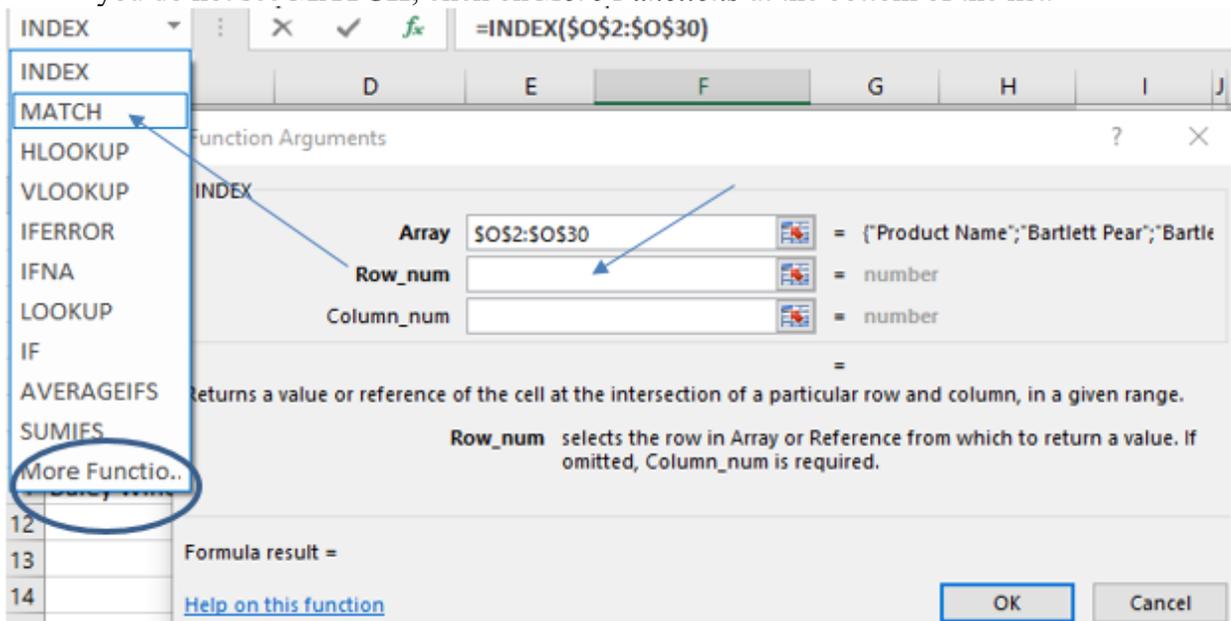
### LET'S TRY IT!

We are going to use the **INDEX** and **MATCH** functions to look up the Product Name based upon the Product ID. We are using the same example from earlier, so it will be easier to compare the **VLOOKUP** and this **INDEX MATCH**.

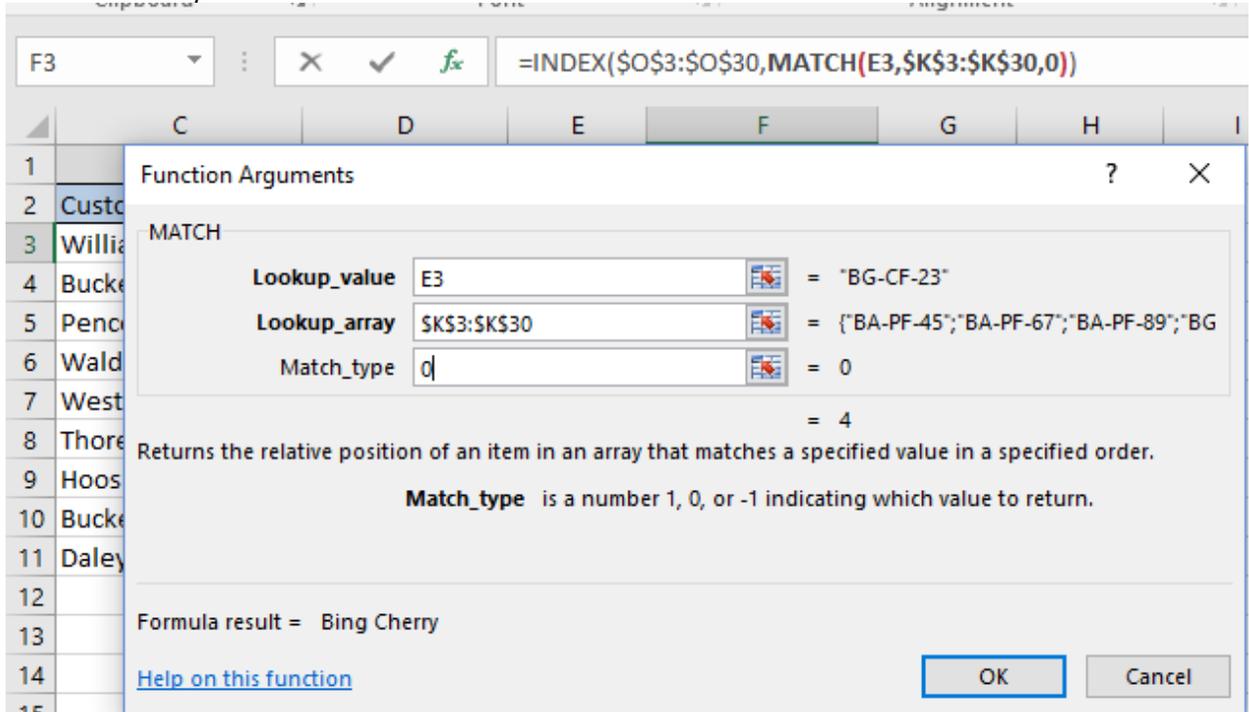
1. Open INDEX\_MATCH.xlsx and click on the sheet named Garden.
2. Click in cell **F3**.
3. Select **Index** from the *Lookup and Reference* category.



4. Click **OK**.
5. Click **OK** again if a dialog box offers you different syntax choices.
6. Click in the *Array* section if necessary, and then select **\$O\$3:\$O\$30** which is the *Product Name* column. This is the column we want to search and retrieve a match.
7. Click in *Row\_num* and then go back to *Name Box* and select the **MATCH** function. If you do not see **MATCH**, click on *More Functions* at the bottom of the list.



8. Click in *Lookup value* and select **E3** which is the value we want to look for.



9. In *Lookup\_array* type **\$K\$3:\$K\$30** which contains the column of data we want to search for a match in.  
 10. In *Match\_type* enter a 0 for an exact match.  
 11. Click **OK**.

The **INDEX MATCH** formula is **INDEX(\$O\$3:\$O\$30,MATCH(E3,\$K\$3:\$K\$30,0))**

The **VLOOKUP** formula is **=VLOOKUP(E3,\$K\$3:\$Q\$30,5,FALSE)**

The components are quite similar – the two equations look at things a little differently. The **VLOOKUP** looks at the whole table and then specifies the column to search in – Column 5. Whereas, the **INDEX MATCH** formula is identified as O3:O30, which is the 5<sup>th</sup> column.

### Review Exercise

On Your Own- Use Index Match To Find The Discount Based Upon Quantity Purchased.

1. Open INDEXMATCH\_SPORTINGGOODS.xlsx.
2. Select the SportingGoods Worksheet.

To keep it simple, all the information is on one sheet. This is a sporting goods store, and they offer Discounts based upon Quantity purchased. At Row 22 you can see the quantity discount information and the associated discount percentage. Typically, this information would be in a different worksheet or file, but for our purposes it is on the same worksheet to make things simpler.

Your objective in this review exercise is, in Cell **H4**, to find the Discount based upon the Quantity shown in Column E, using the Quantity/Discount table shown in rows 22-29. Give it a try.

There is an answer sheet in the Excel file and I have it displayed below. In my answer, I used range names but you can use cell references if you wish.

1	A	B	C	D	E	F	G	H	I	J	K	L	M	N
2	<b>PK Sporting Goods -Shipments to Stores</b>						Hints: Need two sets absolute cell references		What happened to the row 18?					
3	Ship Date	Product Line	Store	State	Qty	Unit price	Total	Discount	Net Price					
4	2/27/2016	Bikes	Indianapolis	IN	75	350.00	26,250.00	1%	25,987.50					
5	3/5/2016	Bikes	Central	IN	100	300.00	30,000.00	5%	28,500.00					
6	3/22/2016	Bikes	South Shore	MA	200	400.00	80,000.00	8%	73,600.00					
7	3/2/2016	Bikes	Downtown	IL	250	500.00	125,000.00	8%	115,000.00					
8	3/25/2016	Bikes	Loop	IL	300	350.00	105,000.00	10%	94,500.00					
9	3/15/2016	Bikes	Manhattan	NY	600	600.00	360,000.00	15%	306,000.00					
10	4/1/2016	Bikes	Upstate	NY	400	450.00	180,000.00	12%	158,400.00					
11	4/1/2016	Golf Clubs	Indianapolis	IN	850	500.00	425,000.00	16%	357,000.00					
12	1/7/2016	Scooters	Loop	IL	200	135.00	27,000.00	8%	24,840.00					
13	1/11/2016	Scooters	Chicago	IL	375	135.00	50,625.00	10%	45,562.50					
14	1/8/2016	Skates	Newbury	MA	400	75.00	30,000.00	12%	26,400.00					
15	1/1/2016	Golf Clubs	Manhattan	NY	750	900.00	675,000.00	16%	567,000.00					
16	1/4/2016	Skis	Newbury	MA	800	300.00	240,000.00	16%	201,600.00					
17	1/14/2016	Skis	North Shore	MA	600	300.00	180,000.00	15%	153,000.00					
18	1/6/2016	Toboggan	Upstate	NY	50	135.00	6,750.00	#N/A	#N/A					
19									Notice the # N/A - you didn't do anything wrong The Qty 50 is just outside the table array which begins with 75					
20														
21	Qty Discount													
22	75	1%												
23	100	5%												
24	200	8%												
25	300	10%												
26	400	12%												
27	500	15%												
28	750	16%												
29	1000	20%												
30														
31														
32														
33														
34														
35														

Lookup Table



☞ Once you create the formula and copy it down, notice that row 18 shows #N/A- the shipping quantity of 50 is less than the starting discount quantity of 75 so- Excel shows a #N/A error message.

## XLOOKUP

As mentioned earlier, **XLOOKUP()** is a new function that was still in beta as of September 2019; however, it may now be available and if you have Excel 365 subscription, I suggest you check and see if you have it yet.

**XLOOKUP** was designed to improve **VLOOKUP** and address the shortcomings that people have complained about. Microsoft claims that **XLOOKUP** is “more powerful than **INDEX/MATCH** and more approachable than **VLOOKUP**.”<sup>3</sup> It allows you to search in one column and return a result from the same row in another column, no matter which side the return column is on. So, the order of the columns do not matter and you can even search from the bottom up if you wish.

The syntax is:

```
=XLOOKUP(lookup_value, lookup_array, return_array, [match_mode], [search_mode])
```

Below is an example from Microsoft.<sup>4</sup>

### Example 1

The following example uses a simple **XLOOKUP** to look up a country name, and return its telephone country code. It only includes the `lookup_value` (cell F2), `lookup_array` (range B2:B11), and `return_array` (range D2:D11) arguments. It does not include the `match_mode` argument, as it defaults to an exact match.

	A	B	C	D	E	F	G
1		Country	Abr	Prefix		What is the dial code?	
2		China	CN	+86		Brazil	+55
3		India	IN	+91			
4		United States	US	+1			
5		Indonesia	ID	+62			
6		Brazil	BR	+55			
7		Pakistan	PK	+92			
8		Nigeria	NG	+234			
9		Bangladesh	BD	+880			
10		Russia	RU	+7			
11		Mexico	MX	+52			

**Note:** **XLOOKUP** is different from **VLOOKUP** in that it uses separate lookup and return arrays, where **VLOOKUP** uses a single table array followed by a column index number. The equivalent **VLOOKUP** formula in this case would be: `=VLOOKUP(F2,B2:D11,3,FALSE)`

<sup>3</sup> <https://www.cnbc.com/2019/09/01/microsoft-releases-excel-xlookup-feature-spreadsheet-jockeys-rejoice.html>

<sup>4</sup> <https://support.office.com/en-us/article/XLOOKUP>

The **OFFSET** function returns a reference to a range that is a specified number of rows and columns from a cell or range of cells. The reference that is returned can be a single cell or a range of cells. You can specify the number of rows and the number of columns to be returned.

**OFFSET Function:**

The basic syntax of the function: **OFFSET(reference,rows,cols)**

<b>Reference</b>	The cell(s) from which you want to base the Offset. Reference must refer to a cell or range of adjacent cells. <b>Consider it the anchor or the starting point.</b>
<b>Rows</b>	The number of rows, up or down, that you want the upper-left cell to refer to. Using 10 as the rows argument specifies that the upper-left cell in the reference is 10 rows below reference. Rows can be positive (below the starting reference) or negative (above the starting reference). <b>How many rows to move – up or down?</b>
<b>Cols</b>	The number of columns, to the left or right, which you want the upper-left cell of the result to refer to. Using 8 as the columns argument specifies that the upper-left cell in the reference is 8 columns to the right of reference. Columns can also be positive (to the right of the starting reference) or negative (to the left of the starting reference). <b>How many columns do you want to move – right or left?</b>
<b>Height</b>	Indicates the number of rows to be included in the range (optional argument). <b>Range size.</b>
<b>Width</b>	Indicates the number of columns to be included in the range (optional argument). <b>Range size.</b>

This is a different type of function syntax than you are probably used to.

I generally use **OFFSET** when creating dynamic (interactive) charts. However, I wanted to find a different type of example because many people do not create charts. If you are interested in

updating charts automatically, check out my Interactive Charts course.

	A	B
1	<b>Date</b>	<b>Sales</b>
2	1/1/2016	25
3	1/2/2016	10
4	1/3/2016	15
5	1/4/2016	89
6	1/5/2016	75
7	1/6/2016	36
8	1/7/2016	12
9	1/8/2016	148
10	1/9/2016	56
11	1/10/2016	894
12	1/11/2016	123
13	1/12/2016	52
14	1/13/2016	41
15	1/14/2016	200
16	1/15/2016	105

In the example below, I want to track and sum the last 7 days of sales. Sounds easy, right? All you have to do is use the SUM function. =SUM(B10:B16) = \$1471. But what if you need to continuously update this throughout the year, and you don't want to update it manually every day? Or, what if you just wanted to add the last week of sales? This is where **OFFSET** shines. To accomplish this exercise, we are going to use **OFFSET** and the **COUNTA** function. You rarely see the **OFFSET** function without the **COUNTA** function.

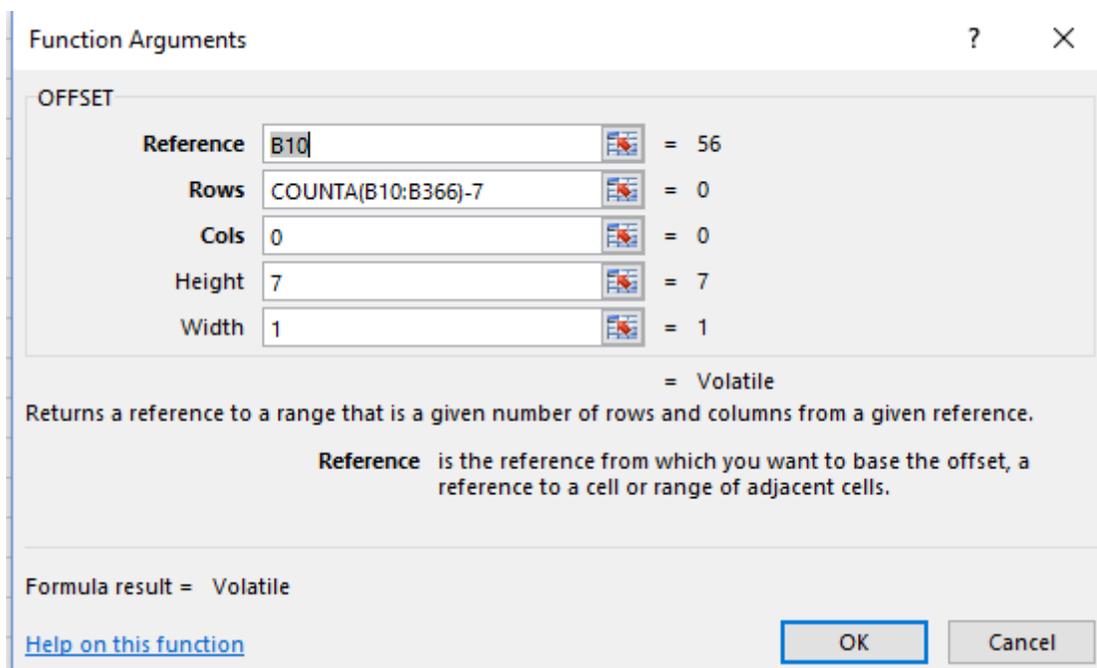
The **COUNTA** function counts both text and values. Using the **COUNTA** function is better than using **COUNT**, as the latter only counts cells containing values, and we want to make sure we count everything. We are going to include the **COUNTA** function so Excel knows to count 7 rows up from the bottom of the data, and then to add those 7 values together.

Excel 2007 and later versions allow data to be formatted as a Table and will automatically update the data. This **OFFSET/COUNTA** method works in all Excel versions, and in complex situations that the Table feature cannot handle.

**Here is the formula we are going to use: =SUM(OFFSET(B10,COUNTA(B10:B366)-7,0,7,1))**

Let's break it apart and see what it is doing. The **SUM** function is obviously adding. So, let's look at the **OFFSET** component, which is what the **SUM** function is adding.





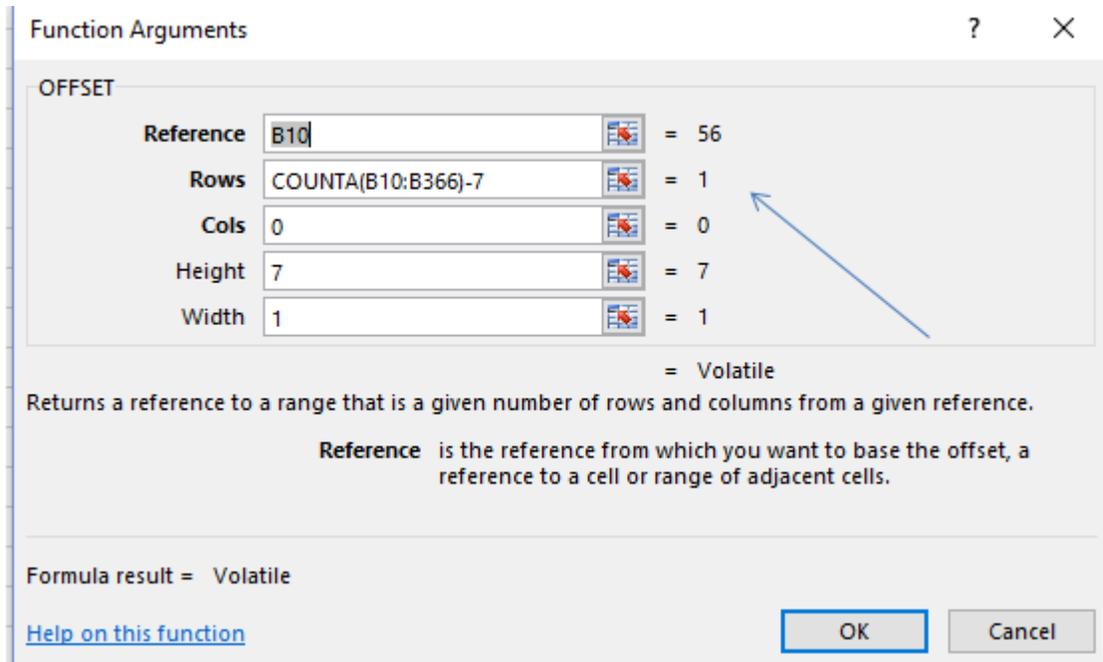
- **Reference:** B10 tells Excel where to start – this is the anchor or starting point.
- **Rows:** COUNTA(B10:B366)-7 tells Excel that the data range is from B10 to B366, and it counts how many values are currently in that column. It counts the number of values, which in this case would be 7, and subtracts 7, so the answer is 0. It is telling Excel - don't move any rows.
- **COLS:** 0 tells Excel to stay in the same column and not include any other columns aside from Column B.
- **Height:** 7 tells Excel to go up and include 7 cells in the range.
- **Width:** 1 tells Excel that only 1 column is involved.

Notice that the resulting formula is Volatile. It is considered volatile because it can change if a value is added, deleted, or changed. If you are familiar with the date function =NOW (), it is also considered a volatile function since it changes each day.

So, the formula breaks down as follows:

```
=SUM(OFFSET(B10,COUNTA(B10:B366)-7,0,7,1))
=SUM(OFFSET(B10,0,0,7))
=Sum(B10:B17)=1471
```

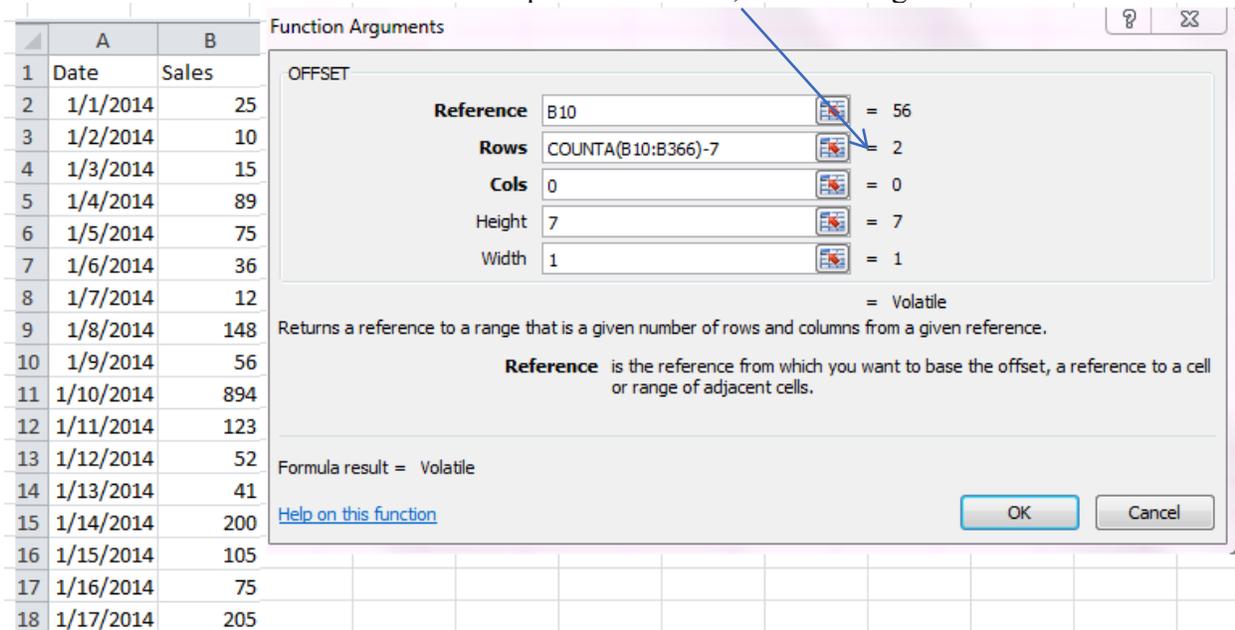
It seems like we have gone to a lot of trouble for nothing, but this is not the case. If this doesn't make sense yet, it will in a moment. Watch what happens when I add sales for January 16th into cell B17.



The formula automatically updates when I added another day of sales. The starting point is still B10, but this time, instead of 7 cell values in the range of B10 to B366, there are 8, so 8 minus 7 is 1.

The formula now reads **OFFSET(B10,1,0,7,1)** which tells Excel to go to the starting point B10 and go down 1 row, stay in the same column, and include the 7 cells in the range. Excel translates this to **OFFSET(B11:B17)** and this the range that Excel will now add.

As sales are added at the bottom of the spreadsheet rows, it will change.

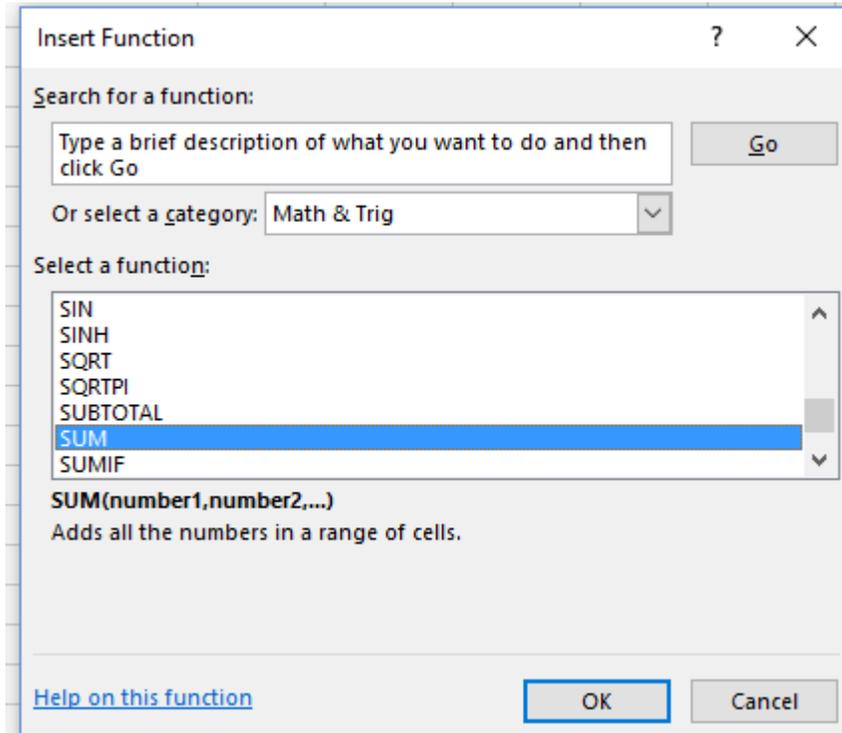


If I added January 17 so that the data is actually from B10 to B18, the **COUNTA** function would find 9 cells with values. So, 9-7 would result in 2 which tells Excel to go to B10, the starting point, and move down 2 rows, and then add the values in the next 7 cells. Everything else remains the same.

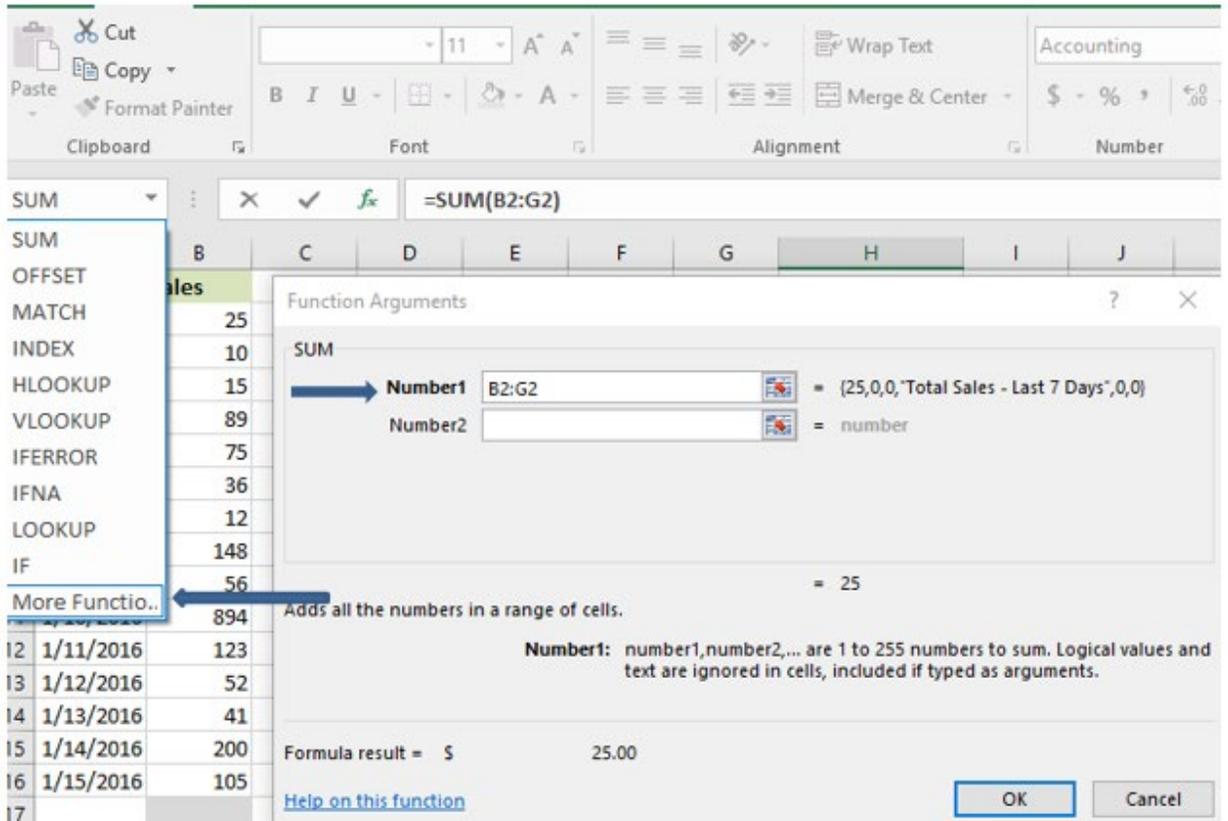
## LET'S TRY IT!

We are going to use **OFFSET** and **COUNTA** to create a dynamic function that will automatically update and sum the last 7 days of sales.

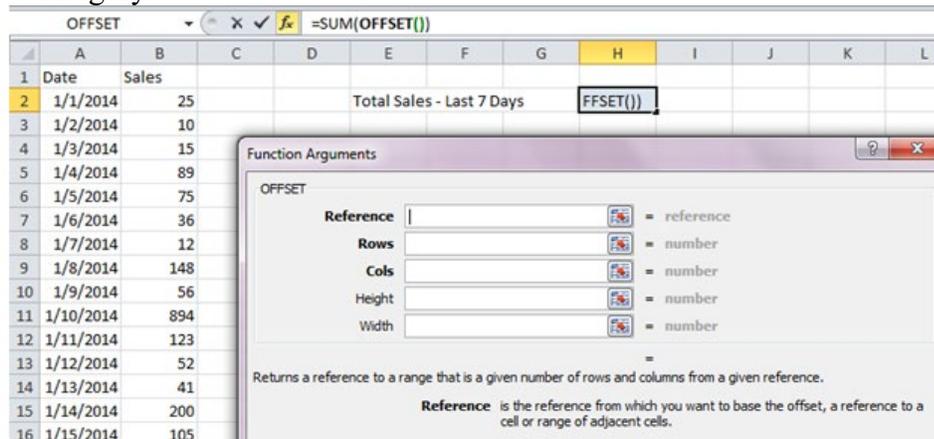
1. Open **OFFSET.xlsx** and select the sheet named **Sales\_OFFSET**.
2. Click in Cell **H2** and then click on the **fx** icon.
3. Select **Sum** from the *Math and Trig* category.



4. Click **OK**.
5. Make sure your cursor is in *Number1*.



- Click on the drop-down arrow in the *Name Box* and select **OFFSET**. Click on *More Functions...* If you do not see **OFFSET** look for it in the *Lookup and Reference* category.



- Enter **B10** in *Reference* section.
- In *Rows...* type **COUNTA(B10:B366)-7**  
Remember we only want the last 7 days of sales which is why we are subtracting 7. I arbitrarily selected 366 as the range assuming I would be doing this daily for a year (365 or 366 days). (You could select COUNTA instead of typing it in – I just thought this was easier.)
- Enter **0** for *Cols*
- For **7** for *Height*.

11. Enter **1** for *Width*.
12. Click **OK**.
13. Your answer should be \$1471 in cell H2.
14. Go to **B17** and enter **100** for Day 8's sale. You should see the total at **H2** has changed to \$1515, as it is now adding B11 through B17.

Some people prefer to use **OFFSET** with **MATCH** instead of using **INDEX MATCH**.

The problem with Reference Functions such as **OFFSET** and **INDIRECT** is that they are volatile, which means they are constantly changing and calculating. If you are working with a large spreadsheet you may find yourself waiting while your spreadsheet recalculates.

### Review Exercise

On Your Own- Create A Dynamic Function That Displays The Last 30 Days Of Sales. This exercise is similar to the one above. In this one, we want to have the last 30 days of sales automatically display.

1. Open **OFFSET.xlsx** if necessary and click on the sheet named *Review*.

	A	B
1	Date	Daily Sales
2	1/1/2016	\$ 75
3	1/2/2016	\$ 25
4	1/3/2016	\$ 35
5	1/4/2016	\$ 200
6	1/5/2016	\$ 56
7	1/6/2016	\$ 45
8	1/7/2016	\$ 5
9	1/8/2016	\$ 65
10	1/9/2016	\$ 25
11	1/10/2016	\$ 41
12	1/11/2016	\$ 62
13	1/12/2016	\$ 82
14	1/13/2016	\$ 40
15	1/14/2016	\$ 100
16	1/15/2016	\$ 90
17	1/16/2016	\$ 93
18	1/17/2016	\$ 31
19	1/18/2016	\$ 43
20	1/19/2016	\$ 148
21	1/20/2016	\$ 69
22	1/21/2016	\$ 56
23	1/22/2016	\$ 65
24	1/23/2016	\$ 81
25	1/24/2016	\$ 31
26	1/25/2016	\$ 51
27	1/26/2016	\$ 77
28	1/27/2016	\$ 102
29	1/28/2016	\$ 50
30	1/29/2016	\$ 124
31	1/30/2016	\$ 112

An answer sheet immediately follows.

	A	B	C	D	E	F	G	H	I
1	Date	Daily Sales							
2	1/1/2016	\$ 75	Day 1		Total Sales - Last 30Days			\$ 2,078	
3	1/2/2016	\$ 25	Day 2	Day 1					

### INDIRECT Function

The **INDIRECT** function is cool. When you first look at it, you wonder what the heck you can do with it, and then suddenly you realize that you have a lot of applications for it.

The **INDIRECT** function accepts a text string as an argument, and then evaluates the text string to determine the relevant cell or range reference. What does that mean? It's easier to show you. Let's start with a basic example:

	A	B	C
1	b1	100	
2			
3	b1	=INDIRECT("A1")	
4	100	=INDIRECT(A1)	
5			

Based on the Excel spreadsheet screenshot:

**=Indirect("A1")** Returns the contents of the referenced cell which is **B1**.

**=Indirect(A1)** Returns the actual contents of the referenced cell. Excel sees that cell A1 contains the cell reference B1, and it goes and returns the value in B1 which is **100**.

If cell A1 had contained text such as CPA, then CPA would have been returned if quotes had been used. However, if quotes were not used, you would see a #REF! Error, since there is no cell reference called CPA.

Okay, so what can you do with this?

Do you have an Excel workbook that has a sheet for each month, and a summary sheet that displays key calculations for the current month? If not, perhaps you have a file containing sheets by brand or product line and then a summary sheet? If so, then you probably spend a lot of time linking or copying and pasting. Using the **INDIRECT** function will save you time. It will allow you to use that time more productively for analyzing the data, as it allows you to look up and retrieve data from a specific sheet.

In the example below, I have a summary sheet that tracks the current month dollar volume of shipments. If you want to follow along, please open **INDIRECT.xlsx**.

B6					
=INDIRECT(B4&"!F19")					
	A	B	C	D	E
1	<b>Rockport Sporting Goods- Store Shipments</b>				
2	<b>Summary</b>				
3					
4	Month	Jan			
5					
6	Total Shipments \$	\$ 2,338,250			

summary	jan	feb	mar
---------	-----	-----	-----

The supporting sheets with the store information are labeled by month: Jan, Feb and March. Instead of linking or pasting numbers into cell **B6** into the summary sheet each month, I can automate the process by using the **INDIRECT** function. Notice that cell **B4** is showing the month January, and that B6 is showing Total January shipments.

The formula I use to retrieve the total shipment dollars shipped in January is

=INDIRECT(B4&"!F19"). This formula tells Excel go look at cell **B4** and to find the cell or range reference found there. In this case Excel looks for **JAN** which is a sheet name. The *ampersand* joins the *month* name with the *cell reference* of **F19**. The exclamation mark indicates that whatever is displayed before it is a sheet name, and whatever follows it is a cell reference.

Excel interprets this as: Go to the sheet named **Jan** and go to cell **F19**.

	A	B	C	D	E	F
1	Rockport Sporting Goods - Shipment to Stores by Month					
2						
3	Ship Date	Product Line	Store	State	Qty	Total Shipment
4	1/5/2016	Bikes	Indianapolis	IN	50	\$ 17,500
5	1/6/2016	Bikes	Sacramento	CA	100	\$ 40,000
6	1/7/2016	Bikes	Quincy	MA	200	\$ 75,000
7	1/8/2016	Bikes	Lincoln Park	IL	250	\$ 96,250
8	1/9/2016	Bikes	Burlington	MA	300	\$ 105,000
9	1/6/2016	Golf clubs	Manhattan	NY	500	\$ 450,000
10	1/9/2016	Golf clubs	Austin	TX	400	\$ 240,000
11	1/12/2016	Scooters	Indianapolis	IN	450	\$ 60,750
12	1/15/2016	Skis	Oak Park	IL	500	\$ 350,000
13	1/18/2016	Skates	Chicago	ILL	125	\$ 18,750
14	1/21/2016	Skis	Jeffersonville	VT	150	\$ 105,000
15	1/24/2016	Skis	Pawtucket	RI	50	\$ 35,000
16	1/27/2016	Bikes	Worcester	MA	250	\$ 100,000
17	1/30/2016	Sleds	Brookline	MA	100	\$ 7,500
18	1/2/2016	Golf clubs	Milton	MA	750	\$ 637,500
19	Total				4175	\$ 2,338,250
20						



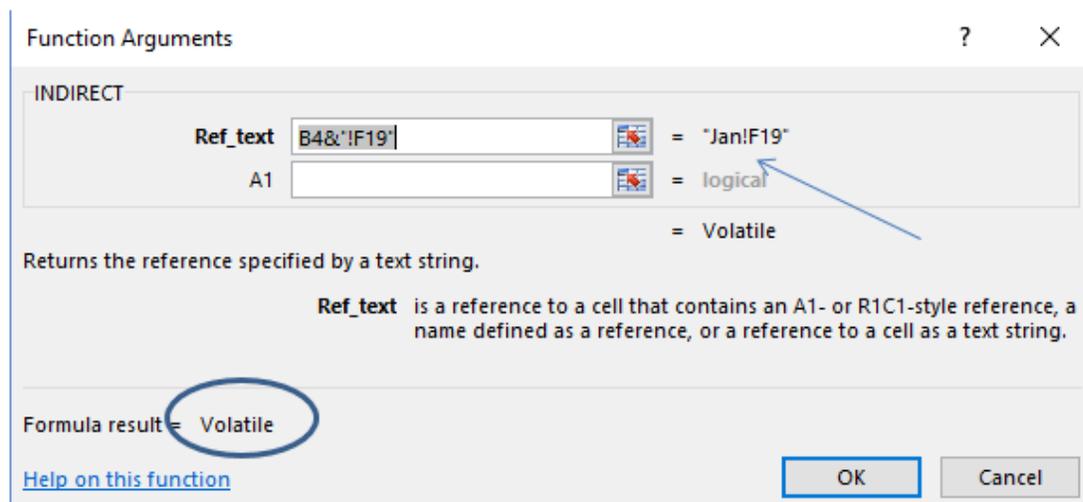
Excel goes to the January sheet and returns the value found in **F19** to this summary sheet. If I wanted to see the value of **F19** on the February sheet, all I need to do is change the value in **B4** to Feb to match the name of the actual sheet.

**LET’S TRY IT!**

We are going to use the **INDIRECT** function to pull Jan Shipment sales into the Summary sheet.

1. Open **INDIRECT.xlsx** and click on the Summary sheet.
2. Click in cell **B6**.
3. Select **Indirect** from the *Lookup and Reference* category.
4. Enter the information as shown in the screen shot below.





5. Click **OK**.

Remember the exclamation! in the formula tells Excel that Jan is a sheet name. If you ever linked between sheets in a workbook you will see that the syntax is **=Sheetname! Cell reference**. It reads it as: Go to the sheet named Jan and retrieve whatever is in cell **F19**. So, Excel goes to the Jan sheet and retrieves the value of 2,338,250 at cell **F19**, and returns it to cell **B6** in the summary sheet.

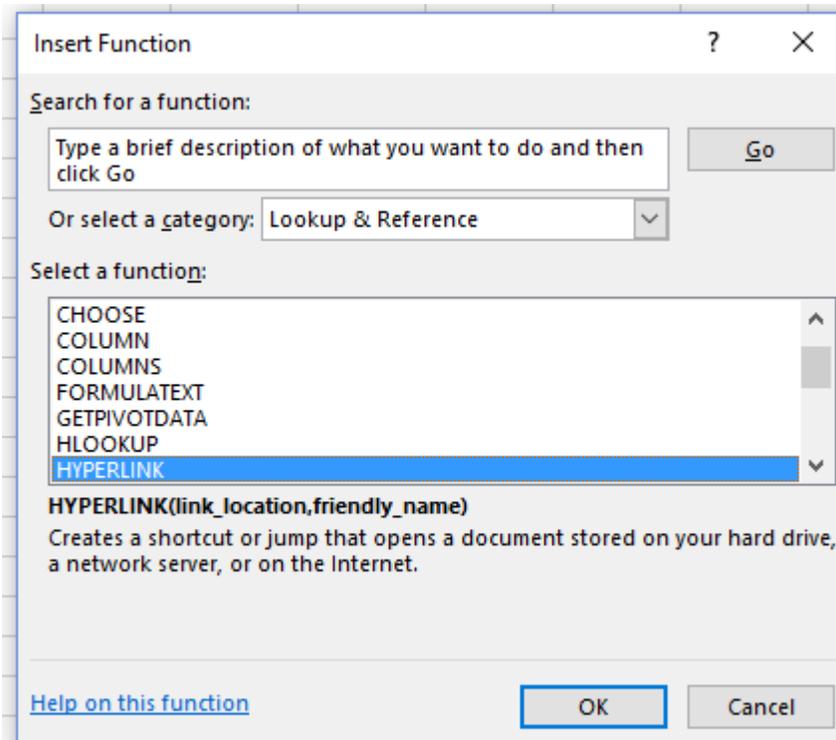
☞ Total Feb shipments are in cell F19 on the Feb Sheet – if you change **B4** from Jan to Feb - you will see the Shipments number change.

This example was simple because not every month is going to have the exact same number of shipments. What happens if every month has a different number of rows or isn't nicely totaled? If the column had not been totaled, I could have used a formula such as **=SUM(INDIRECT(B4&"!F1:F40"))** which would have it add F1 through F40 on the specified sheet. If you had no idea how many rows were being populated you could have substituted **F:F** for **F1:F40**. (If you know the sheet has totals, either select the correct range or delete the totals; otherwise, you are going to double-count.)

**Tip:** To make it more efficient, use a data validation drop-down list of months in B4.

## HYPERLINK Function

The **HYPERLINK** function is in the Lookup and Reference category, but it is different than the other functions we have looked at in this course. Everyone is familiar with the term Hyperlink and typically associates it with clicking on a link to hop to a new webpage. The Excel **HYPERLINK** function allows you to do that, but it also allows you to jump to a document that is stored on a network server or an intranet. When you click the Excel cell that contains the Hyperlink function, Excel opens the file that is stored at that link location.

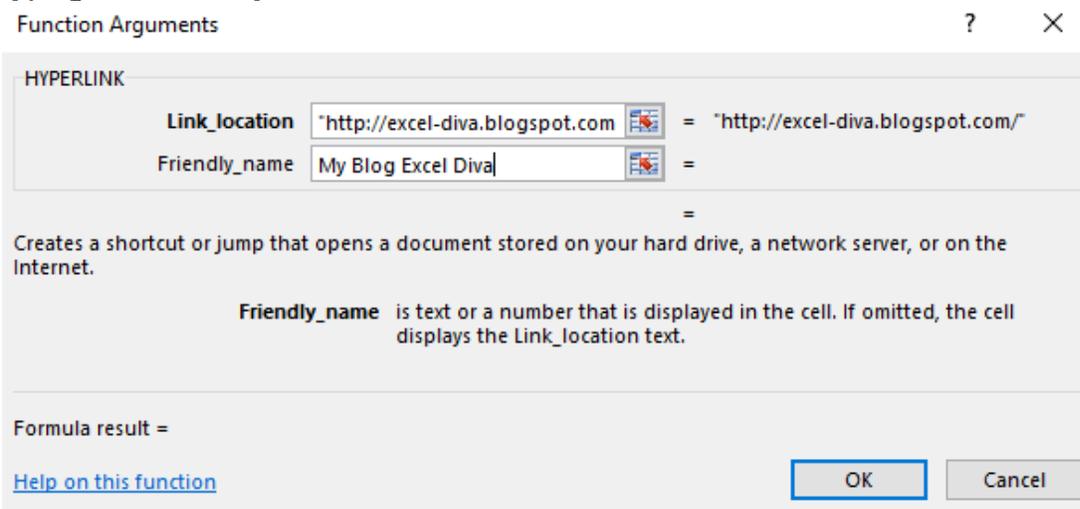


**Syntax: Hyperlink(link\_location, [friendly\_name])**

This feature can be useful if you are sharing files because it makes it easier for other users to access the file, if you want them to.

You can create hyperlinks to webpages, to a cell in another file, or even a cell within the same workbook. I personally find it easier to use the *Insert Hyperlink* icon if I want to hyperlink to another Excel file, or even internally in the same workbook, because using the function requires you to enter all the file structure information with correct syntax.

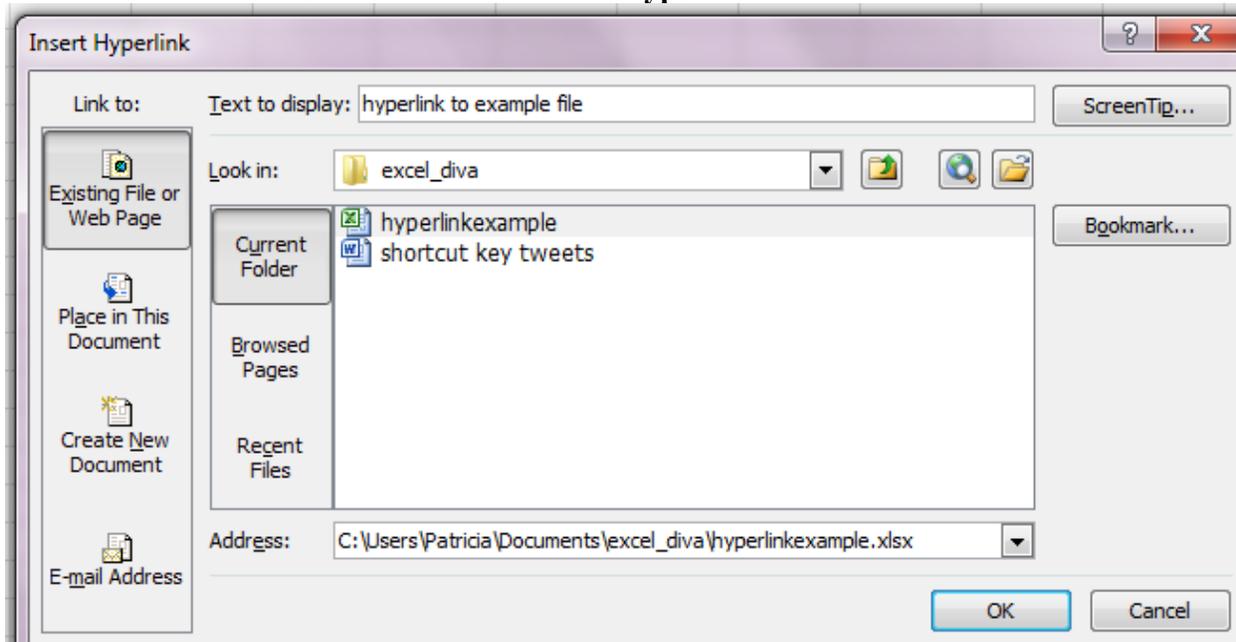
Below is an example of using the hyperlink to access a web page. In this case, if you clicked on the hyperlink it would take you to my blog. I pasted the address in the link location instead of typing it in manually.



To be honest, I almost always use the **Insert Hyperlink** icon which is located on the **Insert** Tab.



Click on the **Insert** Tab to see the **Insert Hyperlink** icon.



Using this dialog box, you can select web pages, the existing document, or a new file. Using this method, I did not have to type in the address - I could just select it, which of course is much easier.

## **Review Questions – Section 6**

The review questions accompanying this course are designed to assist you in achieving the course learning objectives. The review section is not graded; do not submit it in place of your qualified assessment. While completing the review questions, it may be helpful to study any unfamiliar terms in the glossary in addition to course content. After completing the review questions, proceed to the review question answers and rationales.

7. With INDEX MATCH, the lookup table must be sorted in:
  - a. A-Z order
  - b. Z-A order
  - c. Chronological order
  - d. Order does not matter

## Review Question Answers and Rationales

Review question answer choices are accompanied by unique, logical reasoning (rationales) as to why an answer is correct or incorrect. Evaluative feedback to incorrect responses and reinforcement feedback to correct responses are both provided.

1. The Excel LOOKUP function has \_\_\_\_\_ form(s).
  - a. 1. Incorrect. The LOOKUP function has more than 1 form.
  - b. 2. Correct. LOOKUP has 2 forms: the Vector Form and the Array Form.**
  - c. 3. Incorrect. LOOKUP does not have 3 forms.
  - d. 4. Incorrect. LOOKUP has less than 4 forms.
  
2. To create a drop-down list you would select List from the \_\_\_\_\_ section of the Data Validation's Validation criteria dialog box.
  - a. Allow:. Correct. There is a dropdown arrow beside Allow that allows you to select List.**
  - b. Data:. Incorrect. Data's dropdown arrow shows choices such as Between and Less Than. It does not include List.
  - c. Source. Incorrect. Source is where you enter the range of cells where the list is or is where you can type in values that will display in the list.
  - d. Validate. Incorrect. Validate is not a choice in the Data Validation dialog box.
  
3. If there are 3 columns in the lookup table (table array), VLOOKUP will search down the \_\_\_\_\_ column as it tries to match the lookup value.
  - a. First. Correct. A VLOOKUP always looks in the leftmost column of the table. This is the default.**
  - b. Second. Incorrect. A VLOOKUP does not look in the second column of the table for a match.
  - c. Third. Incorrect. A VLOOKUP does not look in the third column of the table for a match.
  - d. VLOOKUP will search whatever column is specified by the user. Incorrect. There is no argument in the VLOOKUP to specify what column to search for in the table array. However, there is a column index argument to specify the column to search in the data itself.

4. \_\_\_\_\_ is a wildcard character.
- #. Incorrect. # is not a wildcard character. You typically see # as part of an error message.
  - \*. Correct. An asterisk \* represents any number of characters. For example, c\*t would include cat, cut, coat, cost, coat.**
  - \$. Incorrect. A \$ in Excel is typically associated with absolute cell reference.
  - !. Incorrect. A ! is typically seen in a formula if you are linking cells in different workbooks.
5. To create a VLOOKUP across multiple sheets, incorporate the \_\_\_\_\_ function along with the VLOOKUP.
- SUM. Incorrect. SUM adds up values in cells.
  - ISNA. Incorrect. ISNA tests to see if a cell contains an error message of #/NA and returns a True or a False.
  - IFERROR. Correct. IFERROR tests a cell and returns its value however if it contains an error message. It then looks at its next instructions to determine what to do.**
  - CHOOSE. Incorrect. CHOOSE selects a value from a list.
6. In Hlookup.xlsx, if you want to look up the Petty Cash Amount for January, what would the row\_index\_number be if the array starts at Row 8?
- 5. Correct. A row index number of 5 would return the petty cash amount at row 9 of the spreadsheet.**
  4. Incorrect. A row index of 4 would result in an answer of 22825.67 being returned.
  7. Incorrect. A row index number of 7 would return the 29333.899.
  12. Incorrect. A row index number of 12 would return a RFE# error as there are not 12 rows.
7. With INDEX MATCH, the lookup table must be sorted in:
- A-Z order. Incorrect. The lookup table does not need to be sorted in A-Z order when using the INDEX MATCH function. A VLOOKUP function assumes that the lookup table is in A-Z order.
  - Z-A order. Incorrect. No lookup table in Excel is assumed to be sorted in Z-A order.
  - Chronological order. Incorrect. Excel does not assume chronological order in INDEX MATCH.
  - Order does not matter. Correct. One of the reasons for the INDEX MATCH popularity is that the lookup table does not need to be sorted.**

## Glossary

This is a glossary of key terms with definitions. Please review any terms with which you are not familiar.

**Absolute cell reference:** A cell or range of cells that remain at the same address whether or not the corresponding formula is moved. This is the opposite of a relative cell reference which is the Excel default.

**Array:** contiguous Range of cells that are considered to belong together. An array is considered an absolute reference. Excel treats them as a unit.

**CHOOSE:** An Excel function that returns the values from an existing list.

**ISNA:** Checks for the #N/A (value not available) error and returns a TRUE if found.

**IFERROR:** If a value or resulting calculation returns an error such as DIV/0 or #N/A, the IFERROR function tells Excel what to replace the error message with.

**MATCH:** An Excel lookup function which returns the order in the array in which the matched item resides.

**Range names:** A cell or range of cells can be given a name. Naming them creates an absolute cell reference.

**Transpose:** To flip from a horizontal position to vertical or vice versa.

**Wildcard:** A symbol used to replace or represent one or more characters. A wildcard can be either an asterisk (\*) which represents one or more characters, or a question mark (?), which represents a single character.

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## Qualified Assessment

Become an Expert on Excel Lookup Functions

Course # 2164583, Version 2007

Publication/Revision Date:

July 2020

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1. The LOOKUP function can be found in the \_\_\_\_\_ function category.
  - a. Lookup
  - b. Reference
  - c. Lookup and Reference
  - d. Validate
  
2. Which syntax for LOOKUP is correct?
  - a. =LOOKUP( Hamilton, A4:A9,B4:B9)
  - b. =LOOKUP("Hamilton", A4:A9,B4:B9)
  - c. =LOOKUP("Hamilton, A4:A9,B4:B9")
  - d. =LOOKUP("Hamilton, "A4:A9",B4:B9")
  
3. The Data Validation icon can be found on the:
  - a. Data tab
  - b. Validation tab
  - c. Insert tab
  - d. Formula tab
  
4. There are a number of different lookup functions; however \_\_\_\_\_ is currently the most popular.
  - a. INDEX MATCH
  - b. HLOOKUP
  - c. VLOOKUP
  - d. TRANSPOSE

5. The range of cells comprising the lookup table in a VLOOKUP is called the:
  - a. Index
  - b. Match
  - c. Table\_array
  - d. Col\_Index\_Num
  
6. A new function, introduced in 2019, that is supposed to improve on the VLOOKUP() function is called \_\_\_\_\_.
  - a. =VLOOKUPBETTER()
  - b. =XLOOKUP()
  - c. =VLOOKUPSORT()
  - d. =XLOOKUPINDEX()
  
7. Which of the following statements is **NOT TRUE**?
  - a. It is recommended that a lookup table be range named.
  - b. Range names are treated as absolute cell references.
  - c. Unit Cost is an acceptable range name.
  - d. You can create a range name by typing text in the Name box.
  
8. Which of the following statements is **NOT TRUE**?
  - a. Range names are absolute cell references.
  - b. Range names can begin with a number.
  - c. Product Line is an acceptable range name.
  - d. Range names can be used in lookup function syntax.
  
9. If a VLOOKUP did not find an exact match, incorporate the \_\_\_\_\_ function to make sure that #N/A does not display.
  - a. NOERROR
  - b. IFERROR
  - c. ERROR
  - d. NAERROR
  
10. You have a parts database and want to search for different types of pliers (such as needle nose pliers, channel lock pliers, and pliers-diagonal cut) \_\_\_\_\_ would be the best choice to use in a VLOOKUP.
  - a. "pliers"
  - b. \*pliers"
  - c. "\*"&"pliers"&"\*"
  - d. \*&pliers\*

11. In the Combining VLOOKUPS section, we created VLOOKUPS for pricing and for shipping costs and then added the costs together before multiplying by quantity. To accomplish this, we combined the VLOOKUPS by using a:
  - a. +
  - b. &
  - c. /
  - d. x
  
12. IFERROR() is a \_\_\_\_\_ function.
  - a. Lookup
  - b. Reference
  - c. Logic
  - d. Text
  
13. To use VLOOKUP across multiple sheets, incorporate the Excel function:
  - a. CHOOSE
  - b. IFERROR
  - c. ISNA
  - d. TRANSPOSE
  
14. The syntax for CHOOSE is:
  - a. (Table, Value 1, Value 2,...Value 254)
  - b. (Index\_number, Value1, Value2,...Value254)
  - c. (Index\_number, Value 1, Value2,..Value 254, FALSE)
  - d. (Index\_number, Value 1, Value2,..Value 254, TRUE)
  
15. To trick VLOOKUP into selecting a column other than the first column to find a match, incorporate the \_\_\_\_\_ function.
  - a. CHOOSE
  - b. ISNA
  - c. COLUMN
  - d. TRANSPOSE
  
16. Which of the following statements is true?
  - a. LOOKUP is the most complex of the lookup functions.
  - b. CHOOSE is typically used with a lookup table.
  - c. ROW and COLUMN are popular stand-alone lookup and reference functions.
  - d. In most cases, FALSE indicates that you will accept only an exact match or no match.

17. Which LOOKUP function allows you to search for a larger value than an exact match or a smaller value than an exact match?
- INDEX MATCH
  - TRANSPOSE
  - VLOOKUP
  - HYPERLINK
18. In Index Match, select \_\_\_\_\_ for an exact match.
- 0
  - 1
  - 2
  - 3
19. In comparison to VLOOKUP and INDEX MATCH, HLOOKUP is **NOT** used very much because:
- It is a new function that people are unaware of
  - It is harder to use than the other functions
  - Most people build spreadsheets vertically
  - It is not a LOOKUP function
20. Which function belongs with the syntax =\_\_(Reference, Rows, Cols)?
- VLOOKUP
  - HLOOKUP
  - LOOKUP
  - OFFSET
21. If you want your chart or data to update automatically, use:
- CHOOSE
  - OFFSET
  - TRANSPOSE
  - VLOOKUP
22. To count both text and numbers, use the \_\_\_\_\_ function.
- COUNT
  - COUNTA
  - COUNTIF
  - COUNTBLANK

23. OFFSET is typically used with this function:
- a. COUNTBLANK
  - b. COUNTA
  - c. TRANSPOSE
  - d. MATCH
24. Reference the data in the second sheet of *Final\_Exam\_References.xlsx* to answer the following question. If you used =INDIRECT(A1) you would receive the following answer:
- a. C2
  - b. 0
  - c. 5
  - d. 100
25. To switch from one file to another or to a web page, use the \_\_\_\_\_ function.
- a. INDIRECT
  - b. JUMP
  - c. LINK
  - d. HYPERLINK



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| 2. ____ | 7. ____  | 12. ____ | 17. ____ | 22. ____ |
| 3. ____ | 8. ____  | 13. ____ | 18. ____ | 23. ____ |
| 4. ____ | 9. ____  | 14. ____ | 19. ____ | 24. ____ |
| 5. ____ | 10. ____ | 15. ____ | 20. ____ | 25. ____ |



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