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## Trapping Errors within Excel Formulas

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By David H. Ringstrom, CPA

From time to time you may craft a formula that in some cases will return an error, such as #DIV/0! or #N/A. Many users overcome this situation by using combinations of the IF, ISERROR, and ISNA worksheet functions. However, using these functions in concert can sometimes result in unnecessarily complex formulas. In this article, I'll discuss an alternative available to anyone using Excel 2007 or later.



Let's first start with a common scenario, where calculating the percentage change between two numbers results in a #DIV/0! error, as illustrated in Figure 1. Presently, the formula in cell D2 takes this form:

`=B2-C2)/B2`

	A	B	C	D	E	F
1		This Year	Last Year	% Change		
2	Apples	378	446	-18%	<code>=B2-C2)/B2</code>	
3	Oranges	487	236	52%		
4	Pears	0	253	#DIV/0!		
5	Kiwi	329	245	26%		

**=(B4-C4)/B4 returns #DIV/0! because cell B4 equals zero.**

Figure 1: Excel returns a #DIV/0! error when you attempt to divide by zero.

As you can see, when we copy this formula down the column, D4 returns #DIV/0! because cell B4 equals zero. To eliminate the #DIV/0! error, we can amend the formula to take this form:

`=IF(ISERROR((B2-C2)/B2),"",(B2-C2)/B2)`

As shown in Figure 2, the formula in cell D4 now returns a dash instead of #DIV/0!.

	A	B	C	D	E	F
1		This Year	Last Year	% Change		
2	Apples	378	446	-18%		
3	Oranges	487	236	52%		
4	Pears	0	253	-		
5	Kiwi	329	245	26%		

**Amending the formula (B4-C4)/B4 to this**


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	A	B	C	D	E	F
1		This Year	Last Year	% Change		
2	Apples	378	446	-18%		
3	Oranges	487	236	52%		
4	Pears	0	253	-		
5	Kiwi	329	245	26%		

**Amending the formula (B4-C4)/B4 to this**  
`=IF(ISERROR((B4-C4)/B4),"",(B4-C4)/B4)`  
 eliminates the #DIV/0! error and displays a dash instead.

**Figure 2:** A combination of IF and ISERROR can display alternative results when a calculation results in an error.

For the uninitiated, the IF function has three arguments, or inputs, which are:

- logical\_test – In this case, the ISERROR function carries out the test and either returns TRUE or FALSE.
- value\_if\_true – If ISERROR returns TRUE, we want Excel to return a dash, which we must enclose in double quotes. The quotes are only required when we want the IF statement to return text, so there's no need to enclose numeric values, such as zero, in quotes.
- value\_if\_false – If ISERROR returns FALSE, we want Excel to perform our original calculation.

Although valid, this approach introduces complexity to the formula because we must repeat our original calculation twice. However, as shown in Figure 3, if our spreadsheet will only be used in Excel 2007 or later, we can streamline the formula to this:

```
=IFERROR((B2-C2)/B2,"-")
```

	A	B	C	D	E	F
1		This Year	Last Year	% Change		
2	Apples	378	446	-18%		
3	Oranges	487	236	52%		
4	Pears	0	253	-		
5	Kiwi	329	245	26%		

**Figure 3:** The IFERROR function streamlines complex error-trapping formulas.

First introduced in Excel 2007, IFERROR has two arguments:

- value – This is the calculation we wish to test for errors.
- value\_if\_error – This is the result we wish to display should our calculation return an error.

As you can see, IFERROR eliminates the need to repeat any portion of the calculation. However, it isn't backwards compatible with earlier versions of Excel. As shown in Figure 4, the IFERROR function will return #NAME? in Excel 2003 and earlier. If you need compatibility with earlier versions of Excel, use the aforementioned IF/ISERROR approach instead.

	A	B	C	D	E	F
1		This Year	Last Year	% Change		
2	Apples	378	446	#NAME?		
3	Oranges	487	236	#NAME?		
4	Pears	0	253	#NAME?		
5	Kiwi	329	245	#NAME?		

**Figure 4:** The IFERROR function is incompatible with Excel 2003 and earlier, but can be

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Figure 5, you can craft a formula to trap #N/A errors only, but display other # sign errors like #DIV/0!:

```
=IF(ISNA(VLOOKUP(A8,$A$1:$D$5,4,0)),0,VLOOKUP(A8,$A$1:$D$5,4,0))
```

	A	B	C	D	E	F	G	H
1		This Year	Last Year	% Change				
2	Apples	378	446	-18%				
3	Oranges	487	236	52%				
4	Pears	0	253	#DIV/0!				
5	Kiwi	329	245	26%				
6								
7	Sales	% Change						
8	Apples	18%						
9	Oranges	0%						
10	Pears	0%						
11	Kiwi	0%						
12								
13								
14								
15								
16								

=IF(ISNA(VLOOKUP(A8,\$A\$1:\$D\$5,4,0)),0,VLOOKUP(A8,\$A\$1:\$D\$5,4,0))  
 returns #DIV/0! here because ISNA only tests for #N/A errors.

=IF(ISNA(VLOOKUP(A10,\$A\$1:\$D\$5,4,0)),0,VLOOKUP(A10,\$A\$1:\$D\$5,4,0))  
 returns 0% because Strawberries do not appear on the list in cells A1 through D5.

Figure 5: ISNA tests specifically for #N/A errors but will allow other errors to be displayed.

Sharp-eyed readers will notice that I used a zero in place of the typical FALSE within VLOOKUP to indicate an exact match. If you're unfamiliar with VLOOKUP, it's a function that's used to return values from a list that has four inputs:

- **lookup\_value** – This represents the item that you're looking for within a list. For instance, in the formula above, A8 signifies that we want to look for the word "Apples."
- **table\_array** – This represents the cell coordinates for the list you wish to search. In the formula above, our list is comprised of cells A1 through D5. VLOOKUP searches for the lookup\_value in the first column of the table\_array.
- **col\_index\_num** – This argument tells VLOOKUP which column you want to return a value from when a match is found in the first column. In this case we want to return the % change from the fourth column of our table\_array.
- **range\_lookup** – Use this cryptic setting to signify if you want an exact match or an approximate match. In this case, we want an exact match on the word "Apples," so enter the word FALSE or a zero in this final argument. Omit this argument, or use the word TRUE or a one in that position to signify an approximate match, such as if you were looking up a tax bracket based on a gross income number.

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