ADVANCING WITH SPREADSHEETS

Taking your Data-Analysis Further

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LAYOUT AND RESOURCES

LAYOUT

This presentation is designed to work with the Excel workbook. When you open the workbook you'll notice the tabs match, well almost match, the main topics. Feel free to listen and workaround in the spreadsheet.

RESOURCES

The sites and resources I use when I'm working.

1. Excel help and function builder
2. Google - searches like 'Excel "formula name" example'
3. Office Support for Excel
4. People

NOTE OF THANKS

This presentation and workbook is built upon, and uses examples from, Mary Jo Webster's March 2015 "Excel Magic" presentation.

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STRING FUNCTIONS

LEFT

`LEFT(text, [number of characters])`

Starts with the first character on the left and returns the number characters we specify

Example `LEFT(A1, 2)`

	A	B
1	Tom	=LEFT(A1,2) returns "To"
2	Bob	=LEFT(A2,1) returns "B"

RIGHT

```
RIGHT(text, [number of characters])
```

Starts with the first character on the right and returns the number characters we specify

Example `RIGHT(A1, 2)`

	A	B
1	Tom	=RIGHT(A1,2) returns "om"
2	Bob	=RIGHT(A2,1) returns "b"

MID

```
MID(text, start_num, num_chars)
```

Starts at the location you specify and returns the number of characters you specify

Example `MID(A1, 2, 1)`

	A	B
1	Tom	=MID(A1,2,1) returns "o"
2	Bob	=MID(A2,2,2) returns "ob"

SEARCH

`SEARCH(find text, within_text, [start_num])`

Searches for one text string within another text string and returns the starting position of the searched string.

Example `SEARCH("o", A1)`

	A	B
1	Tom	=SEARCH("o",A1) returns 2
2	Bob	=SEARCH("ob",A2) returns 2

SEARCH + MID

You can combine SEARCH and MID to find the start positions for characters in a text string. For example:

```
=MID(A3, SEARCH(",", A3),100)
```

	A	B
1	St. Paul, MN	=MID(A1, SEARCH(",", A1),100) returns ", MN"

SEARCH + MID (CONTINUED)

Let's clean that up with some math

```
=MID(A3, SEARCH(",", A3)+2,100)
```

	A	B
1	St. Paul, MN	=MID(A1, SEARCH(",", A1)+2, 100) returns "MN"

LEN

`LEN(text)`

Returns the number of characters in a text string.

Example `=LEN(A1)`

	A	B
1	Tom	=LEN(A1) returns 3
2	Bob	=LEN(A2) returns 3

LEN + LEFT

LEN + LEFT (or RIGHT) can be used to grab parts of a text string. For example city and state information within the same cell.

Example `=LEFT(A1,LEN(A1)-3)`

	A	B
1	St. Paul MN	=LEFT(A1,LEN(A1)-3) returns St. Paul

OTHER TEXT FUNCTIONS

SUBSTITUTE

```
SUBSTITUTE(text, old text, new_text, [instance number])
```

Replaces text, specific text, in a string.

```
SUBSTITUTE(A1, "Tom", "Thomas")
```

	A	B
1	Tom Jones	=SUBSTITUTE(A1,"Tom","Thomas") returns Thomas Jones

EXACT

```
EXACT(text_1, text_2)
```

Checks to see if two strings are identical. Useful for checking two lists.

```
EXACT(A1, B1)
```

	A	B	C
1	MN	MN	=EXACT(A1,B2) returns TRUE
2	MN	MA	=EXACT(A2,B2) returns FALSE

REPT

```
REPT(text, number to repeat)
```

Repeats a text a specified number of times.

```
REPT("!", 1000)
```

	A	B
1	5	=REPT("!",A1) returns !!!!!
2	3	=REPT("!",B1) returns !!!

PROPER

```
PROPER(text)
```

Alters the capitalization of text so that the first letter of any string is capitalized and any character that follows a non-letter character.

```
PROPER(A1)
```

	A	B
1	jack h	=PROPER(A1) returns Jack H
2	d7d	=PROPER(B1) returns D7D

UPPER

`UPPER(text)`

Converts all text to uppercase.

`UPPER(A1)`

	A	B
1	jack h	=UPPER(A1) returns JACK H
2	d7d	=UPPER(B1) returns D7D

LOWER

```
LOWER(text)
```

Converts all text to lowercase.

```
LOWER(A1)
```

	A	B
1	JaCk H	=LOWER(A1) returns jack h
2	D7D	=LOWER(B1) returns d7d

IF STATEMENTS

including SUMIF and COUNTIF

BASIC STRUCTURE

```
IF(logical test, if true, if false)
```

IF is used to retun one value if the condition is true and another if the condition is false.

```
IF(A1>B1, "Great", "Bad")
```

	A	B	C
1	3	5	=IF(A1>B1, "Great", "Bad") returns Bad
2	6	1	=IF(A2>B2, "Great", "Bad") returns Great

NESTING IF STATEMENTS

Excel allows you to nest IF statements inside an IF statement. This can become a very powerful tool (just be sure not to confuse yourself). An example

```
IF(logical test, if true, IF(logical test, if true, if false))
```

NESTED EXAMPLE

```
IF(A1>59, IF(A1>89, "A", IF(A1>79, "B",
    IF(A1>65, "C", "D"))),"Failed")
```

	A	B
1	10	?
2	60	?
3	80	?
3	90	?

SUMIF

`SUMIF(range, criteria, [sum_range])`

SUMIF allows you to sum totals given a specific criteria and is great for subtotals

Example: `SUMIF(A1:A3,A2,B1:B3)`

	A	B	C
1	Tom	5	=SUMIF(A1:A3,A1,B1:B3) returns 9
2	Al	1	=SUMIF(A1:A3,A2,B1:B3) returns 1
3	Tom	4	=SUMIF(A1:A3,"Tom",B1:B3) returns 9

COUNTIF

`COUNTIF(range, criteria)`

COUNTIF allows you to count instances of a specific criteria

Example: `COUNTIF(A1:A3,A2`

	A	B	C
1	Tom	5	=COUNTIF(A1:A3,A1) returns 2
2	Al	1	=COUNTIF(A1:A3,A2) returns 1
3	Tom	4	=COUNTIF(A1:A3,"Tom") returns 2

LOOKUPS

VLOOKUP

```
VLOOKUP(lookup value, table array, col index num, [range lookup])
```

Let's break this vertical lookup down:

1. lookup value - the value you would like to look up (has to be the first column set in the table array).
2. table array - range of cells you want to search.
3. col index number - the column number with your return value
4. range lookup - TRUE or FALSE - determines if you want an exact or not

VLOOKUP EXAMPLE

```
=VLOOKUP(A1,A1:C3,2,FALSE)
```

	A	B	C	D
1	Tom	351	879	?
2	Al	201	938	?
3	Jil	765	832	?

HLOOKUP

```
HLOOKUP(lookup value, table array, col index num, [range lookup])
```

Let's break this horizontal lookup down:

1. lookup value - the value you would like to look up (has to be the first column set in the table array).
2. table array - range of cells you want to search.
3. col index number - the column number with your return value
4. range lookup - TRUE or FALSE - determines if you want an exact or not

HLOOKUP EXAMPLE

```
=HLOOKUP(A1,A1:C3,2,FALSE)
```

	A	B	C	D
1	Tom	Al	Jil	?
2	33	201	938	?
3	35	765	832	?

DATES

YEAR

`YEAR(date)`

Returns the year of a given date.

Example: `YEAR(A1)`

	A	B
1	1/5/2015	=YEAR(A1) returns 2015
2	3/2/82	=YEAR(A2) returns 1982

MONTH

`MONTH(date)`

Returns the month of a given date.

Example: `MONTH(A1)`

	A	B
1	1/5/2015	=MONTH(A1) returns 1
2	3/2/82	=MONTH(A2) returns 3

DAY

`DAY(date)`

Returns the day of a given date.

Example: `DAY(A1)`

	A	B
1	1/5/2015	=DAY(A1) returns 5
2	3/2/82	=DAY(A2) returns 2

WEEKDAY

`WEEKDAY(date)`

Returns the day of the week of a given date as a number. 1 for Sunday, 2 for Monday, 3 for Tuesday, etc.

Example: `WEEKDAY(A1)`

	A	B
1	1/5/2015	=WEEKDAY(A1) returns 2 (Monday)
2	3/2/82	=WEEKDAY(A2) returns 3 (Tuesday)

DATEVALUE

```
DATEVALUE(date as text)
```

Converts date string to Excel recognized date value. Useful when dates are stored in text format.

Example: `WEEKDAY("1/3/2015")`

	A	B
1	1/5/2015	=WEEKDAY(A1) returns 42009
2	3/2/82	=WEEKDAY(A2) returns 30012

DATEDIF

`DATEDIF(start_date, end_date, unit)`

Determines the numbers of days, months, and years between two dates.

Example: `DATEDIF("3/5/1982", "1/5/2016", "Y")`

	A	B	C
1	3/5/82	1/5/16	=DATEDIF(A1, B1, "Y") returns 33
2	3/5/82	1/5/16	=DATEDIF(A2, B2, "D") returns 12359

WEEKNUM

`WEEKNUM(date, [return_type])`

Returns the week number of a given date. We can use the return type to change the day of the week the week begins with (the default is Sunday).

Example: `WEEKNUM("1/10/15")`

	A	B
1	1/10/15	=WEEKNUM(A1) returns 2
2	8/30/55	=WEEKNUM(A2) returns 36

TIMES

HOUR

`HOUR(date_time)`

Given a formatted date time cell, returns the hour.

Example: `HOUR(1/10/15 12:45 AM)`

	A	B
1	1/10/15 1:45 AM	=HOUR(A1) returns 1
2	1/10/15 6:15 AM	=HOUR(A2) returns 6

MINUTE

`MINUTE(date_time)`

Given a formatted date time cell, returns the minute.

Example: `MINUTE(1/10/15 12:45 AM)`

	A	B
1	1/10/15 1:45 AM	=MINUTE(A1) returns 45
2	1/10/15 6:15 AM	=MINUTE(A2) returns 15

SECOND

`SECOND(date_time)`

Given a formatted date time cell, returns the second.

Example: `SECOND(1/10/15 12:45:18 AM)`

	A	B
1	1/10/15 1:45:52 AM	=SECOND(A1) returns 52
2	1/10/15 6:15:18 AM	=SECOND(A2) returns 18

TIME

`TIME(hour, minute, second)`

Returns the decimal number for the given time, ranging from 0 to .99988426 (assuming cell was formatted as general)g.

Example: `TIME(HOUR(A1), MINUTE(A1), SECOND(A1))`

	A	B
1	1/10/15 1:45:52 AM	=TIME(HOUR(A1), MINUTE(A1), SECOND(A1)) returns .07351852

ERRORS

#DIV/0!

You're formula is probably trying to divide by zero

#N/A

The formula you're using was not able to produce a valid response, data is missing, or required arguments are missing.

#NAME?

Your formula is referring to a name that Excel doesn't understand. Good chance you have a typo in your workbook.

#NUM!

Your formula contains numeric values that Excel doesn't understand.

#REF!

Your formula contains an invalid reference to a cell (or other data).

#VALUE!

Your formula is having issues with the data types you're using. Often caused by having text, or other restricted characters, in math formulas.

Thank you!

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