Lesson 3: Logic & Reference Functions

This Video

- Excel Educator - Looking Back
- Lesson 1 – Excel Basics
- Lesson 2 – Formulas and Functions
- Excel Educator - Looking Ahead
- Lesson 3 - Logic & Reference Functions
- General Topic
  - Algebra review

MyEducator - Issues

- Don't change file names
- Don't disable macros
  - If you disable macros, you will not get the assignment bar and you won't be able to submit.
- Some Macs work, some don't
  - You really should install Windows on your Mac, use the Computing Commons / library, or use Citrix
  - Until you get your own computer working
  - Do assignments at Computing Commons or Hayden Library
  - Try using Citrix if you can't make it to campus
  - Use Firefox rather than Internet Explorer

MyEducator – Looking Back

- Present value and Future value
- What's the difference?
  - Interest earned (or paid) over time
- Another way of saying "a bird in the hand is worth two in the bush"

PMT(Rate, Nper, Pv, Fv, Type)

- Rate = interest rate for the length of the period
- Nper = the number of payments
- Pv = Present value = the value of the loan at the time it is taken out
- Fv = Future value = 0 if you pay off the loan completely, not 0 = the residual value
  - For example if you are leasing a car, this is what the dealer thinks will be the market value of the car at the end of the lease period
- Type=0 or omitted when payment is at end of period, =1 when payment is at beginning of period
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MyEducator – Looking Forward

• Lesson 3
• Assignment – Logic & Reference Functions
  • Boolean
  • If
  • Lookup
  • Conditional
    • Statistical functions with a “condition”

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MyEducator – Looking Forward

• Boolean
  • Simple example:
    • Set cell A1 to 50
    • Set cell A2 to =A1<5
    • This says take the value in A1 and evaluate if it is equal to 5. In this case, it isn’t so excel returns false.

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• Boolean
  • Another simple example:
    • Set cells A1 = 1, A2 = 2, and A3 = 3
    • Set cell A4 to =SUM(A1:A3)=5
    • This says take the value in A1 to A3 and evaluate if it is equal to 5. In this case, it isn’t so excel returns false.

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MyEducator – Looking Forward

• Almost any formula or function in Excel to take advantage of Boolean logic.
  • Will always evaluate to either TRUE or FALSE
  • It is possible to combine the outcomes of more than one Boolean formula or function and then examine the results of the combined expressions as a separate Boolean expression.
  • Using AND requires all of the Boolean expressions to evaluate as TRUE to result in the final statement being TRUE
  • Using OR requires only one of the Boolean expressions to evaluate as TRUE to result in the final statement being TRUE

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• IF Function
  • The IF function builds on Boolean logic to help you construct flexible formulas.
  • IF function takes 3 arguments (separated by commas)
    • =IF(CONDITION, result if condition is true, result if condition is false)
    • The condition can be quite complex
    • Unlike TRUE and FALSE, “YES” and “NO” are text strings and are enclosed in quotation marks.
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• IF Function
  • Simple Example:
    • Set A1 to 5
    • Set A2 to =IF(A1>10, "greater than 10", "not greater than 10")

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MyEducator – Looking Forward

• Nested If's
  • Nested If's can be overwhelming
  • Use ()'s to keep track of each new IF statement and read from Left to Right.
  • IF(condition1,condition1-TRUE result,
    IF(condition2,condition2-TRUE result,
    IF(condition3,condition3-TRUE result,
    ...)
  No-conditions-TRUE result)))

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MyEducator – Looking Forward

• Conditional Functions (COUNTIF)
  • Conditional functions allow you to perform calculations where the cell references used to complete the calculations depend on the values of other cells in a worksheet.
  • Remember: The COUNT function is used to determine the number of cells that contain numbers in a range of cells.
  • The COUNTIF function allows you to determine the number of cells within a range of cells that contain a specific value.
  • =COUNTIF(range,criteria)
  • COUNTIF function can accept specific values such as numbers, words or phrases (in quotations), or dates.

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MyEducator – Looking Forward

• Conditional Functions (SUMIF)
  • The SUMIF function is used to calculate the total for a set of values that match a specific criterion.
  • =SUMIF(range,criteria,sum_range)
  • Range is which data set you want to look at
  • Criteria is what you want the data set to be evaluated against
  • Sum_range is the value to be added together if the condition is met.

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• Conditional Functions (SUMIF)
  • Example:
Conditional Functions (AVERAGEIF)

- The AVERAGEIF function is similar to SUMIF. Used to average the values for a set of data that match a specific criterion.
- \( \text{AVERAGEIF} \) is used to return the average of the values that match the specified criteria.
- **Example:**

\[
\text{AVERAGEIF} \text{ (range, criteria, [average_range])}
\]

- **Range** is the set of data you want to evaluate.
- **Criteria** is what you want the data set to be evaluated against.
- **Average_range** is the value to be averaged if the condition is met.

Reference Functions

- Reference functions allow you to lookup frequently used values on a reference table in Excel. The correct values are found by matching criterion to matching values on the reference table.
- **VLOOKUP** accepts four arguments:
  - \( \text{VLOOKUP} \text{(lookup_value, table_array, col_index_num, [range_lookup])} \)
  - **lookup_value** is what you are looking up.
  - **table_array** is the table in which it can be found.
  - **col_index_num** is the column (or row) with the answer.
  - **range_lookup** is how you match:
    - **FALSE** – exact match in the column.
    - **TRUE** – column is sorted in ascending order and you find the closest match that is not greater than.

- **Example:**

```
=VLOOKUP(A1, table_array, 2, FALSE)
```

- **HLOOKUP** is similar to **VLOOKUP**.
- **HLOOKUP** accepts four arguments:
  - \( \text{HLOOKUP} \text{(lookup_value, table_array, row_index_number, [range_lookup])} \)
  - **row_index_number** is the row in which the answer is located.
  - **range_lookup** is how you match:
    - **FALSE** – exact match in the row.
    - **TRUE** – row is sorted in ascending order and you find the closest match that is not greater than.
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MyEducator – Looking Forward

• Reference Functions
  • Example

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Blue</td>
<td>White</td>
<td>Pink</td>
<td>Blue</td>
<td>White</td>
<td>Pink</td>
</tr>
<tr>
<td>100</td>
<td>115</td>
<td>91.2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Algebra Review

• Word Problems
  • Substitute “is” for “is” or “are”
  • IF function implied by “when” or “if”
  • Order of Operations (what you do first to last)
    • ()
    • ^ (Exponents)
    • * or / (Multiply or Divide)
    • + or – (Add or Subtract)
  • Keep in mind:
    • You can’t have too many parentheses. They make what you want clear to someone who has forgotten the order of operations. Excel also helps you keep track.

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Algebra Review - Examples

• 1+2-4*2/2 = ?
  • 1+2-4*1/2
  • 1+2
  • 3
  • 1+2-4*2/2
  • 1-2/2
  • 1/2
  • .5

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Algebra Review - Examples

• Functions
  • Algebra that has been done for you
• Arguments
  • What you give the function
  • Can be:
    • Numbers
    • Cell references
    • Array references
    • Formulas
    • Other functions
• Value
  • What the function gives back to you
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Conclusion

- Practice Problems and Test Your Skills Assignments are due on Sunday by 11:59PM MST.
- Plan accordingly. Extensions will not be given.
- Make sure you are ready to submit before pressing the submit button and logging in. I will not be resetting submissions. If you submit early and get a 0, you will still get the average of your two attempts.
- If you have issues on your Mac, use a Windows machine in Computing Commons or one of the libraries on campus.
- Make sure to read all of the lesson, watch all of the videos, and do ALL of the practice problems (multiple times if you need to). Practice makes perfect!