Microsoft Excel: Formulas, Formulas...

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Description: Excel has hundreds of functions and nobody knows them all, but spend some time and learn to create more powerful formulas. Students will dive into decision making functions like if() and lookup() and make Excel work for them! Students will also explore efficient use of multiple sheets in a workbook, creating multi-sheet and multi-workbook formulas. Students will learn about: if() functions, lookup() functions, conditional formatting, and using multiple worksheets in a workbook.

1. Course objectives.
   a. To provide the class with an exploration of spreadsheet design.
   b. To develop computer and spreadsheet literacy.
   c. To address the class’ questions.

2. Schedule
   a. 9:00 Registration
   b. 9:30 Morning session
   c. 12:00 Departure

3. Handouts available in Adobe Portable Document Format (PDF) for download at www.crowleycomputers.com/handouts.htm
1. Formulas: All formulas begin with = or basic math function
   a. Simple operators
      (1) +
      (2) -
      (3) * multiply
      (4) / divide
      (5) ^ exponent
      (6) = <> comparison
   b. Order of operator precedence (or Algebraic Order of Operations, for those of you as old as me!) determines what order calculations occur.
      (1) Calculations do not occur from left to right.
      (2) 3+4*5 does not equal (3+4)*5
      (3) When you're not sure, use (parenthesis) to force order of calculation.
   c. Edit via double clicking on cell, clicking on formula bar or F2

2. Autofill formulas!
   a. Drag Autofill handle - make sure you have a black + mouse cursor.

3. Simplest formula: Bring a value to another location with =

4. Build a complicated formula

5. Functions: Automate creating very complicated formulas!
   a. Use of Autosum
      (1) Select cell for formula (result)
      (2) Click button
      (3) Select proper cells if they are not highlighted correctly.
b. With Excel Xp (2002), Automatic average, count, min and max are available!

6. Using Insert Function (Paste Function in older versions)
   a. All functions are standard functions are available from dialog
   b. Use Search to find a function!!! Describe what you want to do!
      (1) For example: what is the function that finds the “center” value from the list? It is like an average but it is not an average. Search on “central value” or “average.”
   c. Use Category drop down to find related functions.
      (1) Most Recently Used initially contains the most used functions.
      (2) As you use Excel, Most Recently Used contains your functions.
   d. After highlighting a function look below for a description! For still more information, click on Help on this function.
      (1) Older versions of Excel will not take you directly to the correct help screen. Search for the function name.
      (2) At anytime, you can invoke Help from the Help menu or F1 and search on a function.
e. Required / optional arguments

f. Categories of formulas - additional categories may be available if you use Add Ins.
   (1) Most recently used
   (2) All: list all categories
   (3) Financial
   (4) Date & Time
   (5) Math & Trig
   (6) Statistical
   (7) Lookup & Reference: helps find data within Excel
   (8) Database
   (9) Text
   (10) Logical: true / false analysis
   (11) Information: formatting and error handling
   (12) User Defined
   (13) Engineering

7. Navigation and selection acceleration
   a. Get around faster using keyboard cheats!
   b. Select faster using keyboard cheats!
      (1) Shift+????? for range
      (2) F8
   c. Select faster using mouse cheats!
      (1) Shift+click for a range
      (2) Ctrl+click for random
   d. Selecting a full sheet

<table>
<thead>
<tr>
<th>Keyboard Navigation</th>
<th>Cell</th>
<th>Data block</th>
<th>Screen</th>
<th>Current sheet</th>
<th>Sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left</td>
<td>← / Shift+Tab</td>
<td>Ctrl+←</td>
<td>Alt+PgUp</td>
<td>Home (col A)</td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td>→ / Tab</td>
<td>Ctrl+→</td>
<td>Alt+PgDn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up</td>
<td>↑ / Shift+Enter</td>
<td>Ctrl+↑</td>
<td>PgUp</td>
<td>Ctrl+Home (A1)</td>
<td>Ctrl+PgUp</td>
</tr>
<tr>
<td>Down</td>
<td>↓ / Enter</td>
<td>Ctrl+↓</td>
<td>PgDn</td>
<td>Ctrl+End (bot r)</td>
<td>Ctrl+PgDn</td>
</tr>
</tbody>
</table>

8. Formula troubleshooting? If you want the spreadsheet to show the formulas instead of the results, press Ctrl+` to toggle between showing formula values and formulas. That is Ctrl+apostrophe, not a single quote mark.

<table>
<thead>
<tr>
<th>B3</th>
<th>=ABS(PMT($A3/12,$B3*12,$C3))</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>1</td>
<td>$16,500</td>
</tr>
<tr>
<td>2</td>
<td>0.0%</td>
</tr>
<tr>
<td>3</td>
<td>0.5%</td>
</tr>
<tr>
<td>4</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

9. Absolute and relative references
   a. Cell references are normally “relative” references, as
they are copied, the reference moves relative to copy direction.
b. Absolute references lock a reference to a particular row, column or cell. Absolute references do not change as they are copied.
   (1) $ indicates absolute reference to column or row
   (2) F4 rotates through four possible combinations (none, both, row, column)
   (3) Four patterns of absolute and relative references.
       Pattern can be entered manually or with F4.
       (a) None A1
       (b) Column $A1
       (c) Row A$1
       (d) Cell (both) $A$1

10. Pages & working in 3D
a. Navigating
b. Inserting and deleting pages
c. Renaming
d. Copying and moving
e. Grouping and ungrouping using Shift+click and Ctrl+click
f. Generating formulas IE. =SUM(Sheet2:Sheet3!A1) Sheet range prior to exclamation point, cell reference after exclamation point.

11. Formulas across pages
a. Page name(s) prior to ! in cell references
b. Simplest method to build via point and click

12. Advanced cut/copy/paste techniques
a. Four steps!!!
   (1) Select
   (2) Cut or Copy
      (a) Toolbar
      (b) Edit menu
      (c) Right+click menu
      (d) Ctrl+X or Ctrl+C
   (3) Select new location
   (4) Paste (Ctrl+V)

13. Conditional formatting
a. Format, Conditional formatting...

14. Formulas across files
a. File name prior to ! in cell references
b. Simplest method
(1) Open all required sheets
(2) Use mouse to build formula via point and click

15. Reference and Lookup functions - give your spreadsheet power by creating formulas that "make decisions."
   a. IF(logical_test,value_if_true,value_if_false) = returns a value based on whether a value is true or false
      (1) Logical_test is any value or expression that can be evaluated to TRUE or FALSE.
      (2) Value_if_true is the value that is returned if logical_test is TRUE.
      (3) Value_if_false is the value that is returned if logical_test is FALSE.
   b. VLOOKUP(lookup_value,table_array,col_index_num,range_lookup) = look up a value vertically
      (1) Arguments
         (a) lookup_value = "what" you want to look up
         (b) table_array = "where" you want to look it up
         (c) col_index_num = "which" column to return
         (d) range_lookup = TRUE (default) returns approximate match, FALSE returns only exact matches
            (i) If the range_lookup is TRUE, the table_array must be sorted in ascending order!
            (ii) If the range_lookup is FALSE, values do not need to be sorted.
            (iii) If VLOOKUP can't find lookup_value, and range_lookup is FALSE, VLOOKUP returns the #N/A value
      (2) Notes
         (a) If VLOOKUP can't find lookup_value, and range_lookup is TRUE, it uses the largest value that is less than or equal to lookup_value.
         (b) If lookup_value is smaller than the smallest value in the first column of table_array, VLOOKUP returns the #N/A error value.
   c. HLOOKUP(lookup_value,table_array,row_index_num,range_lookup) = look up a value horizontally
      (1) See all VLOOKUP notes
      (2) row_index = "which" row to return
   d. LOOKUP - gives the same functionality, but you define the search range. Works in to modes:
      (1) Vector: LOOKUP(lookup_value,lookup_vector,result_vector)
         (a) lookup_vector = where to find lookup_value
         (b) result_vector = what to return
(2) Array: LOOKUP(lookup_value, array)
   (a) If array covers an area that is wider than it is tall (more columns than rows), LOOKUP searches for lookup_value in the first row.
   (b) If array is square or is taller than it is wide (more rows than columns), LOOKUP searches in the first column.

e. MATCH(lookup_value, lookup_array, match_type)
   (1) Returns the position of the answer rather than a looked up value
   (2) match_type =
      (a) If match_type is 1, MATCH finds the largest value that is less than or equal to lookup_value. Lookup_array must be placed in ascending order: ..., -2, -1, 0, 1, 2, ..., A-Z, FALSE, TRUE.
      (b) If match_type is 0, MATCH finds the first value that is exactly equal to lookup_value. Lookup_array can be in any order.
      (c) If match_type is -1, MATCH finds the smallest value that is greater than or equal to lookup_value. Lookup_array must be placed in descending order: TRUE, FALSE, Z-A, ..., 2, 1, 0, -1, -2, ..., and so on.

f. OFFSET(reference, rows, cols, height, width)
   (1) Returns a (range) reference so many rows and columns from the starting reference.
   (2) Reference = starting point
   (3) Rows = rows from reference, positive value is down from starting reference.
   (4) Columns = columns from reference, positive value is to right from starting reference.
   (5) Height and width use returns a range.