MS EXCEL 2000

Spreadsheet Use, Formulas, Functions, References
More than any other type of personal computer software, the spreadsheet has changed the way people do business. Spreadsheet software allows the user to take control of numbers, manipulating them in ways that would be difficult or impossible otherwise.

A spreadsheet program can make short work of tasks that involve repetitive calculations: budgeting, investment management, business projections, grade books, scientific simulations, checkbooks, and so on. A spreadsheet can also reveal hidden relationships between numbers, taking much of the guesswork out of financial planning and speculation.

Almost all spreadsheet programs are based on a simple concept: the malleable matrix.

Formulas and More

- **Input**: Data that is to be entered into a worksheet.
- **Output**: The information the worksheet is designed to generate.
- **Labels**: Text used to identify (row or column) what the data/formula represents.
- **Data**: The values (numbers, formulas, functions) that establish the working part of the spreadsheet.
- **Order of precedence**: The rules for determining how to perform calculations containing multiple arithmetical operators.
- **Fill Handle**: Small black square found at the lower right corner of the active cell. Identified when the pointer changes to a standard plus symbol when moved over the square.
- **Relative cell reference**: Cell reference which changes according to the location of the cell in which the reference occurs.
- **Error value**: This is a special constant Excel enters when it cannot resolve a formula entry. There are seven different entry possibilities depending on the type of error.
- **Absolute cell reference**: Cell reference which remains fixed even if the cell in which the reference occurs is moved to a new location. Press the F4 key when selecting the cell. (i.e. $E$2)
- **Copying**: Duplicating the formula from one cell to another, with automatic adjustment of cell references to reflect the new cell address.
- **Syntax**: The correct ordering of the parts of a given function.
- **Argument**: The specific values on which the function is to operate.
- **Pointing Method**: Entering cell references into formulas or functions by clicking on the cells rather than typing them.
- **Test Values**: Numbers to use in testing that will generate a known result.
- **Extreme Values**: Very small or large numbers used to observe their effect on formulas or functions.
- **AutoFormat**: A feature that allows you to change a worksheet’s overall appearance by choosing from predefined formats.

Order of Precedence for Mathematical Operations:
Order | Operator | Name
--- | --- | ---
first | ^ | Exponentiation
second | *,/ | Multiplication, Division
third | +,- | Addition, Subtraction

The order of evaluation is from left to right, when two operators have equal precedence.

Calculate the answers to the following problems:
- \(2+3\times4\) = 14
- \((2+3)\times4\) = 20
- \(2\times2^2\) = 8
- \((2\times2)^2\) = 16

CELL VALUES: A1=10, B1=20, C1=3
- \(A1+B1\times C1\) = 70
- \((A1+B1)\times C1\) = 90
- \(A1\div(B1+C1)\) = 3.5
- \(A1/(B1+C1)\) = .435
- \(A1\div B1\times C1\) = 1.5
- \(A1/(B1\times C1)\) = .16667

The ROUND function
- \(ROUND(A1/(B1\times C1),2)\) = 0.17

Copying a Formula Using the Fill Handle
The fill handle may be used to copy a cell or cells, a formula or formulas, and to complete a series (months, days, and numbers).

Copying a Formula Using the Relative References
Demonstrate how the use of relative references allows you to copy formulas without the need to change cell references. Show how references change as you copy across columns and/or rows.

Copying a Formula Using an Absolute Reference
This concept is fundamental to understanding how to structure formulas and functions which will be copied.
<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Student</td>
<td>Test1</td>
<td>Test2</td>
<td>Final</td>
</tr>
<tr>
<td>2</td>
<td>Costa, Frank</td>
<td>70</td>
<td>80</td>
<td>90</td>
</tr>
<tr>
<td>3</td>
<td>Ford, Judd</td>
<td>70</td>
<td>85</td>
<td>80</td>
</tr>
<tr>
<td>4</td>
<td>Grauer, Jessica</td>
<td>90</td>
<td>80</td>
<td>98</td>
</tr>
<tr>
<td>5</td>
<td>Howard, Lauren</td>
<td>80</td>
<td>78</td>
<td>98</td>
</tr>
<tr>
<td>6</td>
<td>Krein, Darren</td>
<td>85</td>
<td>70</td>
<td>95</td>
</tr>
<tr>
<td>7</td>
<td>Moldof, Adam</td>
<td>75</td>
<td>75</td>
<td>80</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Class Averages</td>
<td>=AVERAGE(B2:B7)</td>
<td>COPY HERE</td>
<td>COPY HERE</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Exam Weights</td>
<td>25%</td>
<td>25%</td>
<td>50%</td>
</tr>
</tbody>
</table>

**Copying Cell Contents Using the Copy and Paste Method**

This is also a method to use when you need to copy, exactly, the contents of a cell or cells.

**Renaming the Worksheet**

Recall how to change the name of the sheets themselves.

**Saving the New Workbook**

Review the steps to save a workbook. Place emphasis on the need to be certain that they save their work to the correct area (Floppy A and not the C drive or whatever works for your laboratories).

**Excel Functions**

Excel functions are organized into nine categories. Demonstrate how to enter the same function using the Function.

- An Excel function is a calculation tool that performs a predefined operation. It is a mathematical or special program, a set of instructions, built to simplify any need to create complex formulas or structures in the worksheet.
- Each function has a syntax, which tells you the order in which you must type the parts of the function and where to put commas, parentheses, and other punctuation.
- The arguments for a function can be constant numbers such as 1, 21, 567.24; cell references such as B56, G9; or ranges such as B10:D24.
- Functions may be used in formulas. You may type a function into a formula or use the Function Wizard button, and then follow the instructions in the dialog boxes. The Function Wizard is often easier, especially if you don't know the function's syntax.
- **SUM, AVERAGE, MAX, and MIN.**

- Financial functions, such as the PMT function, are especially important in business.

Note the different cell formats:
<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Price of car</td>
<td>$12,192</td>
</tr>
<tr>
<td>2</td>
<td>Manufacturer's rebate</td>
<td>$1,000</td>
</tr>
<tr>
<td>3</td>
<td>Down payment</td>
<td>$3,000</td>
</tr>
<tr>
<td>4</td>
<td>Amount to finance</td>
<td>$8,192</td>
</tr>
<tr>
<td>5</td>
<td>Interest rate</td>
<td>8%</td>
</tr>
<tr>
<td>6</td>
<td>Term (years)</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Monthly payment</td>
<td>$200.00</td>
</tr>
</tbody>
</table>

Contents of cells:

B4 =B1-B2-B3

B7 =PMT(B5/12,B6*12,-B4)

Arguments to PMT:
- Interest rate per period (annual rate divided by 12)
- Number of periods (4 years * 12 months/year)
- Amount of loan (entered as a negative amount)

Testing the Worksheet

The following are some common causes of inaccurate results:

- Using the wrong operator
- Forgetting the order of operations
- Typographical error
- Highlighting the wrong range
- Modifying the worksheet without re-checking formulas

Improving the Worksheet

Layout: Column or row widths can be changed in several ways. You can set directly or you can use the mouse. Setting directly can be done from the menu or by right clicking and selecting the width or height statement. The only problem with this option is that you must have a good estimate of the width or height or you will have to guess several times. For students, it is easier if they use the mouse, as they do not have the experience to estimate this accurately. They can either drag to fit their specific wishes or double click to use the fit-to option.

Inserting rows and columns, while the wording is correct, students repeatedly get confused as to where the insertion will occur. Stress that the blank row(s) or column(s) will be inserted immediately above or to the left of the selected row(s) or column(s).

Previewing the Worksheet using Print Preview

This allows the students the opportunity to see the spreadsheet and decide if it is how they want it to look prior to printing. If not, they can close and make changes. After completing their changes advise to preview again before printing. An important feature is the Page Break Preview, which can be adjusted from the Print Preview Screen.

Centering the Printout

Centering improves the appearance of the output. If the worksheet is large then center horizontally and vertically. If short, center horizontally only. This will eliminate too much white space at the top of the page. Use the File, Page Setup, Page menus.

Adding Headers and Footers
There is only one point to make when you discuss the functions of the header/footer formatting buttons. Be sure to inform your students of the need to space between the formatting options and to type in words such as page (to get Page 1 rather than just 1; or 10:23 1/1/99 rather than 10:231/1/99).

Documenting the Workbook
This is an important step for them and for anyone working on the worksheet after them. Documentation provides an audit trail so that decisions are retained (the why behind how equations are structured, who created it and for whom).

Adding Cell Comments
Cell comments do not interfere with the worksheet. They appear on the screen only when the pointer is over the mark and they do not print unless you specifically set the command to print them.