

COMPUTER TRAINING

MICROSOFT EXCEL 2007

Macros, Formulas, & Functions

Introduction

This handout is designed to assist the user in the most common functions in Excel.

Using Formulas

Formulas and function are mathematical statements used to perform calculations.

- A formula is an instruction made up by the user to perform a specific calculation.
- All formulas must start with an equal sign and contain cell addresses, numbers, and mathematical operators.
- When preparing a formula it is important to consider the order of mathematical operations. A formula that has more than one operation follows an order of precedence.

The order is as follows from left to right:

1. Exponentiation
2. Multiplication
3. Division
4. Addition
5. Subtraction

Note: If a formula has parenthesis, the operation (s) in the parenthesis is performed first. Remember to use the math acronym **Please Excuse My Dear Aunt Sally** to assist with the order of operations.

Example:

Operator	Meaning	Example	Result (if A1=18 & A2 = 2)
+	Addition	=A1+A2	20
-	Subtraction	=A1-A2	16
*	Multiplication	=A1*A2	36
/	Division	=A1/A2	9
%	Percentage	=A1%A2	.18
^	Exponentiation	=A1^A2	324

Exercise 1

1. Create the worksheet listed shown on the next page. The sale tax is approximately is **6%** entered as **.06**.
2. Enter the labels and values in the exact cell locations shown in the spreadsheet then format the values as currency.

3. Enter the formulas, as shown in the shaded cells. Tap the Enter key after each formula.
4. Copy the formula to the respective cells by using the fill handle and drag downward.
5. Click inside cell **C10** and then click on the down arrow next to the **Auto Sum** command 'Σ' located on the Home tab. Choose the function Average from the menu.
6. Select the cell range **G4:G6**.
7. Repeat the prior steps for cell **C11**, but this time use the Sum function.
8. Format the cells using the currency format with the dollar sign.

	A	B	C	D	E	F	G
1	Merchandise		List Price	Discount	Purchase Price	Sales Tax	Total
2							
3	Printer		345	185	=C3-D3	=E3*\$C\$7	= E3+F3
4	Computer		985	265			
5	Monitor		395	98			
6							
7	Sales Tax		.06				
8							
9	Average Cost		=AVG(G3:G5)				
10	Grand Total		=SUM(G3:G5)				

Exercise 2
Using the PMT Function

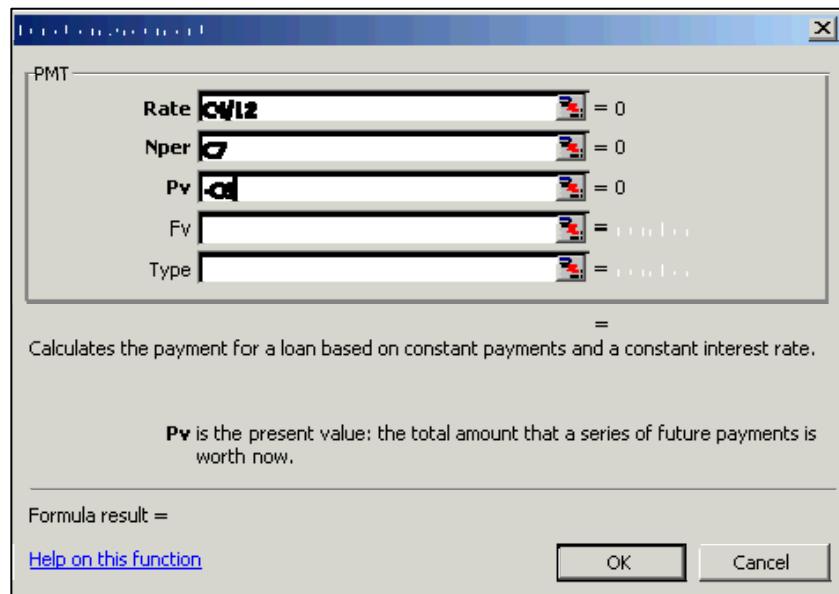
1. Select cell range **A1:C1**. Then click the **Merge & Center** button on the **Home** tab. Resize the Font if you wish.
2. Select cell range **A3:B3**. Click the down arrow next to the **Merge & Center** button and select **Merge Cells**. Drag the **Fill handle** downward to repeat the merge process. Stop after cell range **A8:B8**.

3.

<u>Cell:</u>	<u>Type</u>
A1	Payment Calculator
A3	Sticker Price
A4	Interest Rate
A5	Down Payment
A6	Loan Amount
A7	Months
A8	Monthly Payment

4. Bold cell range **A3:A8**.

5. Hold the **Ctrl-key** down and select cells **C3, C5, C6, and C8**. Right-click and choose **Format Cells | Currency | Decimal places 2** and use the \$ sign. Select the fourth format from the negative numbers box to display the debit format.
6. Select cell **C4**. Right click and then choose **Percentage | Decimal places 2**. Click **OK** and then press the **Enter key three times**. Select cell **C7**. Right-click and choose **Format Cells | Number and change the decimal places to 0**.
7. In cell **C6** type **=C3-C5**. Press **Enter**.
8. Select cell **C8** and click on the **Insert Function button** on the Formula Bar. This will open the **Function dialog box**.
9. Under the heading "*Select a function:*" select the **PMT** function. Click **OK**.
10. Left click and hold down the mouse button on the top part of the dialog box to move the **Function Argument box** to view the cells in your work area.



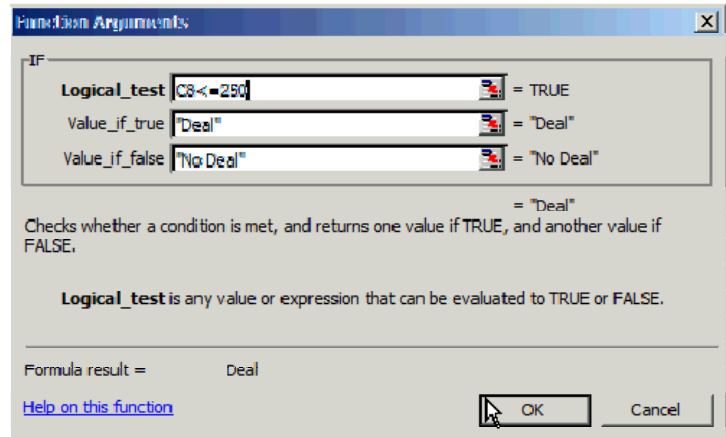
11. Click inside the Argument box "**Rate**," and then click cell **C4**. Press the forward slash / (division) key and then enter **12**. The interest rate is computed annual.
12. Click inside the Argument box **Nper** (number of payments) and then click cell **C7** for the number of payments. Click inside the next Argument box **Pv**. (this stands for the Present value of the loan amount). Type a negative sign (-), then click cell **C6**. The negative sign before C6 allows us to display a positive number. This play an important role in the next exercise.

You have just used the function box to create a spreadsheet that calculates what your payments would be if you were to purchase a vehicle.

Enter amounts for the sticker price, down payment, and interest rate. Change the number of payments and the amount will change. Change the interest rate and amount will increase or decrease. This formula changes with the data entered.

Using the If Statement

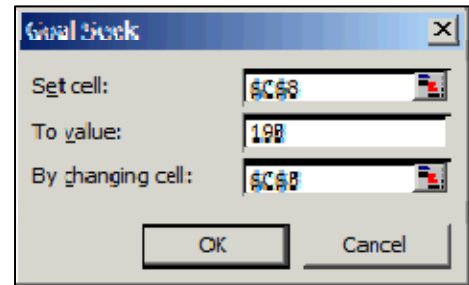
1. In cell **A16**, type **Purchase** and then merge the cell range A16:B16. Bold the range.
2. Click inside cell **C16** and then the **Insert Function** button on the Edit formula bar. Select the **IF Function**.
3. In the **argument box "Logical Test"** enter cell reference **C8** type **<=250**.
4. In the **Value_if_true** box type **Deal**. Press tab.
In the **Value_if_false** box type **No Deal**. Click **OK**.



The decision to purchase will be reflected by one or all of the following factors, (1) amount borrowed, (2) interest rate, (3) down payment, or (4) term of loan.

Using Goal Seek

1. Click the tab "**Data**," and then the command button "**What If Analysis**." Select **Goal Seek** to open the data tool Goal Seek.
2. Collapse the "**Set cell:**" dialog box to select the cell value to change. For this example choose Monthly Payment cell **C8**.
3. Enter a number (goal) in the box "**To value:**" and then press the tab key.
4. Collapse the "**By changing cell:**" dialog box and then click in cell **C5**, Down Payment. Click **OK**. Cell C5 now reflects the down payment required to attain the desired goal.



Exercise 3

Calculating the Total Interest Paid & Total Cost of the Loan

1. Select cell range **A11:B11**. Click the down arrow next to the **Merge & Center** button and select **Merge Cells**. Use the **Fill handle** to repeat the merge process to the range below.
2. In cells **A11** type **Total Interest** and in **A12** type **Total Cost**.
3. Select cells **A11 & A12**. Right click the selected cells and choose **Format Cells | Currency | Decimal** places **2** and use the \$ sign.

- In cell **A11** type $=C7*C8-C6$. Press the tab key.
A12 type $=C7*C8+C5$. Press the tab key. Select cells **A11:A12** and **Bold**.

Creating a Data Table to Analyze a Worksheet

By creating a data table you can compare the answers for several different what if values.

- Select the range **A1:C8**. Copy and Paste in **Sheet 3**.
- Select and **Merge & Center** cell range **E1:H1**. Type *Table Display of Varying Interest Rates* in the new merged cell.
- Enter the following column labels starting in cell **E2** to **H2**.

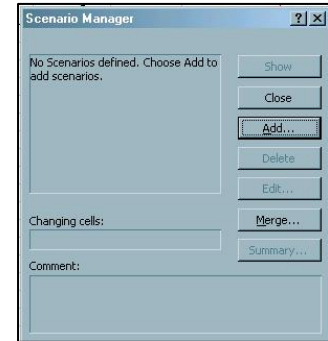
<u>Cell#</u>	<u>Labels</u>
E2	Interest Rate
F2	Monthly Payment
G2	Total Interest
H2	Total Cost

- Select cell range **E2:H2**. On the **Home** tab click **Center** for alignment and then **Format | AutoFit Column Width**.
- Click in cell **E4** and enter **.02** as the first number. Then enter **.0225** in cell **E5**. Select and format both cells as *percentage with two decimal places*.
- Drag the fill handle to cell **E14** and release. Excel incremented each cell by **0.25%**.
- Click in cell **F3**. Type $=C8$, tab or press the right arrow key.
Click in cell **G3**. Type $=C10$, tab or press the right arrow key.
Click in cell **H3**. Type $=C11$, press **Enter**.
- Select the range **E3:H14**. Click the tab "**Data**," and then the command button "**What If Analysis**," then the button **Table**. Click in the "**Column input cell**" box and then either type **C4** or click in cell **C4**. Click **OK**.
- Excel calculates the results of the three formulas in **row 3** for each interest rate in **column D** and immediately fills corresponding values in the data table.
- Select the cell range **F4:H14** and then format the cells as a number with to decimal places.
Click the box to Use a 1000 Separator (,).

Note: At your discretion you may apply borders around the Payment Calculator and the Data Table.

Scenario Summary

1. Click the tab "**Data**," and then the command button "**What If Analysis**," and then **Scenario Manager**.
2. Click the **Add** button and provide a scenario name. Collapse the dialog box "**Changing Cells**" to select the cells that you would like to change and compare against other data. To select non-adjacent cells use **Ctrl+click**.



For example: To change the Interest Rate and the Loans Term (Months).

- ... Hold the Ctrl key down and click in cell **C4**, and then cell **C7**. Click **OK**. The **Scenario Values** dialog box appears.
 - ... Enter the new values in the cells referenced by inputting the new Interest Rate and Loan Term.
 - ... Click the Add button to add another scenario and provide another name. By doing this you are able to compare the results in either a pivot table or summary sheet. Click **OK** and enter the new values.
3. Select **Show** to see the changes in the current spreadsheet or Summary to see the changes summarized. When the Scenario Summary dialog box appears hold down the CTRL key and select cells C8, C11, and C12 and then Click on **OK**. The scenario worksheet displays as shown below.

Scenario Summary			
	Current Values:	Scenario 1	Scenario 2
Changing Cells:			
\$C\$4	2.90%	2.00%	2.25%
\$C\$7	36	24	36
Result Cells:			
\$C\$8	\$290.37	\$425.40	\$287.52
\$C\$10	\$453.38	\$209.66	\$350.67
\$C\$11	\$30,453.38	\$30,209.66	\$30,350.67

Notes: Current Values column represents values of changing cells at time Scenario Summary Report was created. Changing cells for each scenario are highlighted in gray.

Exercise 4
Sorting Custom Lists

1. Insert a new spreadsheet and name it Custom Lists. Enter the data below.

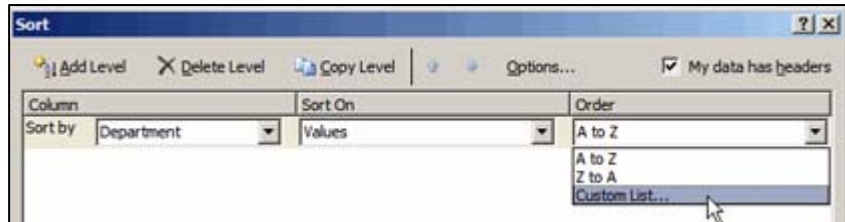
<u>Cell</u>	<u>Entry</u>
A1	Date
B1	Department
C1	Purchase
D1	Cost

2. Starting in cell A2 enter the current date and then use the tab key to enter the data below. The dates may be sequential or incremented and costs not specific to those listed.

Date	Department	Purchase	Cost
2/2/2008	A	Printing	\$44.00
2/3/2008	B	Software	\$124.00
2/4/2008	C	Computers	\$3,200.00
2/5/2008	C	Software	\$500.00
2/6/2008	C	Printing	\$79.00
2/7/2008	A	Computers	\$300.00
2/8/2008	A	Printing	\$1,200.00
2/9/2008	C	Computers	\$55.00
2/10/2008	B	Computers	\$2,400.00
2/11/2008	B	Printing	\$150.00
2/12/2008	A	Software	\$300.00
2/13/2008	B	Printing	\$79.00

3. Select the cell range **A1:D1** and then click on the **Microsoft Office Button**.
4. Click **Excel Options**, the category **Popular**, and then under the label "**Top options for working in Excel**," click **Edit Custom Lists**.
5. In the **Custom Lists** dialog box, verify that the cell reference displayed in the **Import list** from cells box is listed and correct. Click **Import** and then **OK** twice.

- Click in any cell within your data. On the **Home** tab click the buttons **Sort & Filter**, then **Custom Lists**. When the **Sort dialog box** opens choose to *Sort by: Department* under Column and then select **Custom Lists** under Order.



- Select the list **Date, Department, Purchase** and **Cost**. Click **OK** and then the button **Options** above. Choose the *Orientation "Sort top to bottom."* Click **OK** twice.
- Click the tab **Data** and then inside one of the list's headers. Click the button **Subtotals**, under the labels, *At each change in:* select **Department**, *Use Function:* **Sum**, and *Add subtotal to:* check the box **Cost**.

Note: you need to check the boxes *Replace current subtotals* and *Summary below data*. Click **OK**.

- Data should resemble the graphic on the right.

Note: Collapsing the minus buttons on the left side hides the detail displayed such as Dates and Purchases.

	A	B	C	D
1	Date	Department	Purchase	Cost
2	8/2/2002	A	Printing	\$44.00
3	8/2/2002 Total			\$44.00
4	8/7/2002	A	Software	\$300.00
5	8/7/2002 Total			\$300.00
6	8/8/2002	A	Computers	\$1,200.00
7	8/8/2002 Total			\$1,200.00
8	8/12/2002	A	Software	\$300.00
9	8/12/2002 Total			\$300.00
10	8/3/2002	B	Software	\$124.00
11	8/3/2002 Total			\$124.00
12	8/10/2002	B	Computers	\$2,400.00
13	8/10/2002 Total			\$2,400.00
14	8/11/2002	B	Printing	\$150.00
15	8/11/2002 Total			\$150.00
16	8/13/2002	B	Printing	\$79.00
17	8/13/2002 Total			\$79.00
18	8/4/2002	C	Computers	\$3,200.00
19	8/4/2002 Total			\$3,200.00
20	8/5/2002	C	Software	\$500.00
21	8/5/2002 Total			\$500.00
22	8/6/2002	C	Printing	\$79.00
23	8/6/2002 Total			\$79.00
24	8/9/2002	C	Printing	\$55.00
25	8/9/2002 Total			\$55.00
26	Grand Total			\$8,431.00

Recording a Macro

Macro 1

Auto formatting a worksheet

Before beginning note that in order to save a macro in Excel 2007 the workbook must be saved as an Excel Macro-Enable Workbook.

- Insert a New Worksheet into the Workbook and rename the sheet Macro1. Copy and paste the example data from Sheet 4 into the sheet Macro 1. How to: click the rectangle between column A1 and row 1 to select the whole worksheet. Click on the Copy button and then paste the data into Macro 1.
- Click the tab **Developer** and then **Record New Macro**. You can either assign a name or use the default. Choose **This Workbook** from the drop down menu in the dialog box. A description is optional.

3. Select the range **A1:G1** and then click the **Merge & Center** button on the Home tab. Change the font to size **14 Bold**. Select cell range **A2:G2** and repeat only the **Merge & Center**.
4. Select the range **A5:G5** and then click **Bold**.
5. Select the range **C6:G8** and then right click | **Format cells**. Select the tab **Number** | Category | Number. Check the box **Decimal places (2)** and **Use 1000 Separator (,)**.
6. Select the range **C9:G9**. **Right click** | **Format cells** | **Accounting** | (show) **\$ sign, 2 decimal places**.
7. Select cell **A12**. Click the **Bold** button.
8. Select cell **C12**. Click the **Bold** button. **Right click** | **Format cells** | **Accounting** | **show \$ sign and 2 decimal places**. Click the **Stop Macro button**. **Save** the worksheet.
9. Select the entire worksheet as we did in the beginning see Step 1. On the **Home** tab click the button **Clear**, then **Clear Formats**. When the formatting is removed return to the **Developer** tab. Click the command button **Macros** and then run the assigned macro.

Macro 2

Assign a macro to enter your name and the current date

1. Click the tab **Developer** and then **Record New Macro**. You can either assign a name or use the default. Choose **This Workbook** from the drop down menu in the dialog box. A description is optional.
2. Right-click cell **A20** and choose the command **Format cells**. Select **Date** as the Category and then the Type: **"*Wednesday, March 14, 2001."**
3. Next, type =TODAY() in the newly formatted cell. Press **Enter**.
4. In cell **A21**, type your name and then click the button **Stop Macro**. **Save** the worksheet. On the **Home** tab click the command button **Clear**, then **Clear Formats**. Click in any cell then run the assigned Macro.

Macro 3

Deleting Blank Rows

1. Enter some data in a work sheet leaving blank rows between the data. You may use the data in Sheet 5 or type your own.
2. Click the tab **Developer** and then the command button **Record New Macro**. You can either assign a name or use the default. Choose **This Workbook** from the drop down menu in the dialog box. A description is optional.

3. Click on the tab **Home**. Click the commands **Find & Select**, **Go To Special** and then select the option **Blanks**. Click **OK** and the blank rows are now selected.

4. Click the tab **Home** and then the commands **Delete | Delete Rows**. The blank rows will be deleted.

Please note that any merged cells are also deleted.

