

COMPUTER TRAINING

MICROSOFT EXCEL 2007

Macros, Formulas, & Functions

Introduction

This handout is designed to familiarize the user with 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 **C9** and then click on the down arrow next to the **Auto Sum** command 'Σ' located on the Home tab. Choose the **Average** function from the menu.
6. Select the cell range **G3:G5**.
7. Repeat the prior steps for cell **C10**, 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

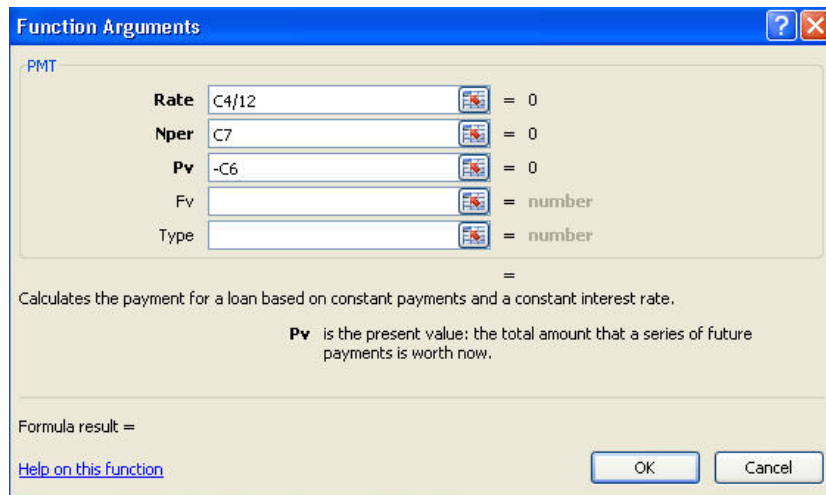
1. Select the cell range **A1:C1** and then click the **Merge & Center** list arrow in the Alignment group on the Home tab. Select **Merge Cells**. Resize the Font if you wish.
2. Select cell range **A3:B3** and then merge the cells. Drag the **Fill handle** downward to repeat the merge process. Stop after cell range **A8:B8**.
3.

Cell:	Type
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.

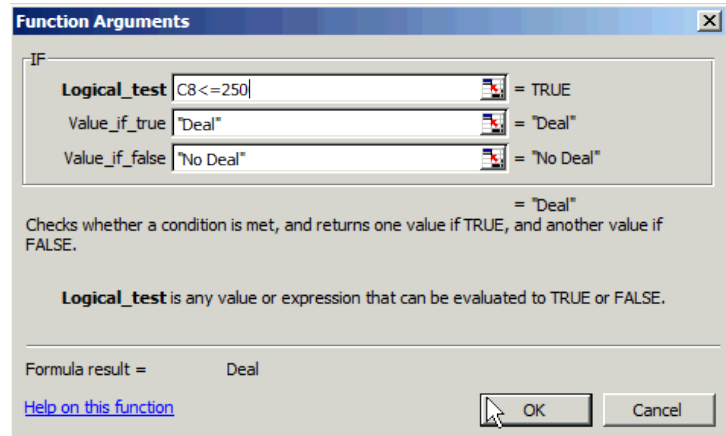
You have just used the function box to create a spreadsheet that calculates what your payments would be if you were to purchase a vehicle.

- 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 and bold the cell range **A16:B16**.
2. Click inside cell **C16** and then the **Insert Function** button on the 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** and then press the **Tab** key.

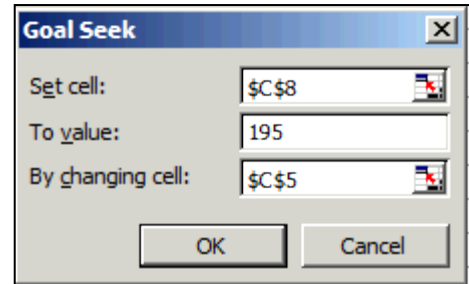


In the **Value_if_false** box type **No Deal**. Click **OK**.

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 "**What If Analysis**" list arrow in the Data Tools group. Select **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 **Merge & Center** list arrow in the Alignment group 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** and **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 and then bold the cell range **A11:A12**.

Creating a Data Table to Analyze a Worksheet

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

- Copy and paste cell range **A1:C8** in Sheet 3.
- Select and then **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**.

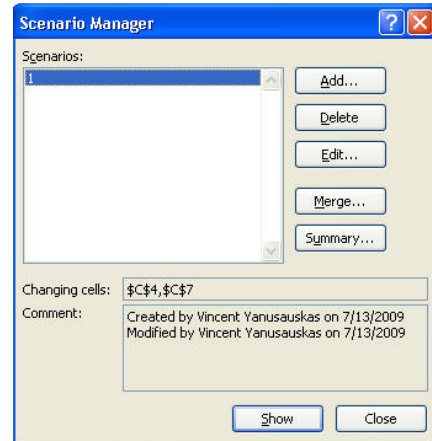
<u>Cell#</u>	<u>Labels</u>
E2	Interest Rate
F2	Monthly Payment
G2	Total Interest
H2	Total Cost

- Select the cell range **E2:H2**. Click the **Center** button in the Alignment group on the **Home** tab. Next, click the Format list arrow and choose "**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 **What If Analysis** list arrow in the Data Tools group on the **Data** tab. Click the button Data Table and then 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 **What If Analysis** list arrow in the Data Tools group on the **Data** tab and then the command **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 press the **Ctrl** key and then click on the respective cells.
3. *For example:* To change the Interest Rate and the Loans Term (Months).

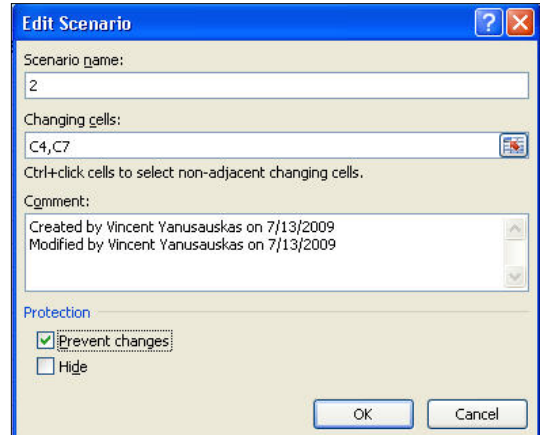


- ... Hold the Ctrl key down and then click on cells **C4** and **C7**. Click **OK**. The **Scenario Values** dialog box appears.
- ... Enter the new values in the cells referenced by inputting the new Interest Rate and Loan Term.
- ... Click the **Add** button to add another scenario and provide another name to compare the results in either a pivot table or summary sheet. Click **OK** and enter the new values.

4. To display the changes in the current spreadsheet remove the checkmark from "Prevent Changes". Click OK and then **Show** to see the changes.

To display the changes summarized in a new worksheet select "**Summary**". When the Scenario Summary dialog box appears, hold down the **Ctrl** key and select cells **C8**, **C10**, and **C11** and then click **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.

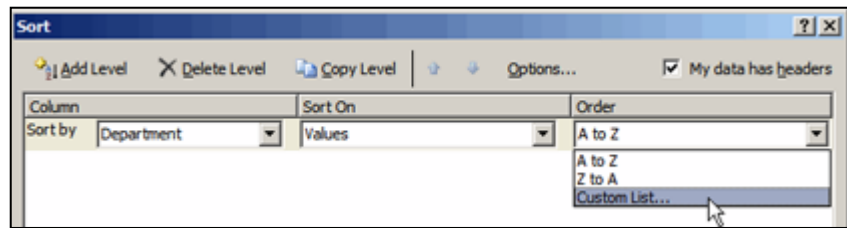
<u>Cell</u>	<u>Entry</u>
A1	Date
B1	Department
C1	Purchase
D1	Cost

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
4/2/2010	A	Printing	\$44.00
4/3/2010	B	Software	\$124.00
4/4/2010	C	Computers	\$3,200.00
4/5/2010	C	Software	\$500.00
4/6/2010	C	Printing	\$79.00
4/7/2010	A	Hardware	\$300.00
4/8/2010	A	Printing	\$1,200.00
4/9/2010	C	Hardware	\$55.00
4/10/2010	B	Hardware	\$2,400.00
4/11/2010	B	Printing	\$150.00
4/12/2010	A	Software	\$300.00
4/13/2010	B	Printing	\$79.00

3. Select the cell range **A1:D1** and then click on the **Microsoft Office Button**.
4. At the bottom of list click **Excel Options**. Choose the category **Popular** 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. Click the **Sort & Filter** list arrow in the Editing group on the **Home** tab. Select the command **Custom Lists** and when the **Sort dialog box** opens choose to *Sort by: Department* under Column. Select **Custom Lists** under Order.



- Select the list **Date, Department, Purchase** and **Cost** and then click **OK**. Click the **Options** button above and set the *Orientation* to "**Sort top to bottom**". Click **OK** twice.
- Click the tab **Data** and then inside one of the list's headers. In the group Outline, select the command **Subtotal**. Change the following - *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.

	A	B	C	D
1	Date	Department	Purchase	Cost
2	7/13/2009	A	Printing	\$44.00
3	7/18/2009	A	Computers	\$300.00
4	7/19/2009	A	Printing	\$1,200.00
5	7/23/2009	A	Software	\$300.00
6		A Total		\$1,844.00
7	7/14/2009	B	Software	\$124.00
8	7/21/2009	B	Computers	\$2,400.00
9	7/22/2009	B	Printing	\$150.00
10	7/24/2009	B	Printing	\$79.00
11		B Total		\$2,753.00
12	7/15/2009	C	Computers	\$3,200.00
13	7/16/2009	C	Software	\$500.00
14	7/17/2009	C	Printing	\$79.00
15	7/20/2009	C	Computers	\$55.00
16		C Total		\$3,834.00
17		Grand Total		\$8,431.00

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

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. In addition you will need to add the Developer tab to the Ribbon.

How to:

Click on the Office button and then the Excel Options button. Choose the category Popular, then check the box "Show Developer tab in the Ribbon".

- Insert a New Worksheet into the Workbook and rename the sheet Macro1, then copy and paste the example data from Sheet 4 into the sheet named **Macro1**.

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 the sheet Macro1.

2. Click on 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 list arrow in the Alignment group and select **Merge & Center** on the **Home** tab. Change the font to size **14 Bold** then repeat only the **Merge & Center** for cell range **A2:G2**.
4. Select and **Bold** cell range **A5:G5**.
5. Select cell 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 and **Bold** cell **A12**.
8. Select and **Bold** cell **C12** and **right click** and choose **Format cells** | **Accounting** | **show \$ sign and 2 decimal places**. Click the **Stop Macro button** and 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"** as displayed.
3. Next, type =TODAY() in the newly formatted cell. Press **Enter**.
4. In cell **A21**, type your name and then click the **Stop Macro** button and 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. Use may use the data in Sheet5 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 **Find & Select** list arrow in the Editing group on the Home Tab. Select the command **Go To Special** and then select the option **Blanks**. Click **OK** to select the blank rows.
4. Click the **Delete** list arrow in the Editing group on the Home tab. Select the command **Delete Rows** to delete all blank rows.

Please note that any merged cells are also deleted.

