Advanced Microsoft Excel

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PMT FUNCTION

The PMT function can be used to calculate the amount of your monthly payment of a loan when the Interest Rate, Number of Payments, and Loan Amount are known. If you create a small table with all these values, as shown in the example in the LOAN PAYMENT sheet tab, then you can easily change the interest rate or loan amount to see how it changes the payment.

The formula is as follows: =PMT(RATE,NPER,PV)

RATE The interest rate on your loan. When you build the formula you should enter the rate divided by 12 to get the monthly interest rate.

NPER The number of monthly payments in the loan. For example, if the loan is a 30 year mortgage, you would enter either 360 or 30*12 for the number of periods.

PV The present value which is the total amount of the loan. Enter the loan amount as a negative in order to obtain a positive payment.

In our example we entered the Interest Rate (RATE) in cell C3, the number of payments (NPER) in cell C4 and the amount of our loan (PV) in cell C5. Based on this, our formula to calculate a monthly payment was:

=PMT(C3/12,C4,-C5)

Notice we divided the Annual percentage rate by 12 in the formula in order to obtain a true monthly interest rate. We also used the negative of cell C5 for the loan amount. This allows our payment amount to display as a positive amount.

SUBTOTALS

When using the subtotal feature, we first need to sort the list by the category we wish to obtain a subtotal for. In our example, we wanted to get a subtotal for each company in our list. Therefore, we need to sort by company before using the subtotal feature.

We sort by highlighting or selecting all of our data (select the whole sheet by clicking the small square in the upper left of the spreadsheet, located above row 1 and to the left of column A - this selects our spreadsheet).

Once we have selected the data, we click on **DATA** tab in the menu bar and select **SORT** from the menu to launch the sort dialogue box.

In the sort dialogue box, make sure to place a check next to **'My data has headers'** in the upper right of the sort dialogue box. This puts the header row cell values into the sort by list boxes as well as keeps the header row from being sorted with the other values.

Now in the "**Sort by**" box, select **COMPANY** from the drop down list, leave the default of **Values** in the **"Sort on"** drop down list and "**A to Z**" in the **Order** drop down list, then click 'OK'. This will sort our spreadsheet by Company.
Once our data list is sorted by COMPANY, we can now easily use the Subtotal feature to obtain subtotals for each individual company.

To apply the Subtotal feature once our list is sorted, click **DATA** in the menu bar and select **SUBTOTAL**. The Subtotal dialogue window will appear. We need to select the options we wish to use for our Subtotal feature.

Select COMPANY in the 'At each change in:' drop down list. This is why we needed to sort the list first. Excel will now subtotal after each change in Company, i.e. Company 1001, Company 1002, etc in our example.

Select SUM in the 'Use function:' drop down list. The SUM function will add the totals of the columns we select.

Place a check in TOTAL PURCHASE for our example. This will apply the SUM function to our TOTAL PURCHASE amounts for each Company. Click OK.

VLOOKUP

The VLOOKUP function is used to return a value based on another cell's value. The function will look up the value you specify in a table (array) of cells and return a value you specify in the same row of the table. Remember, in an earlier class we used the nested IF function, to test a value and return another value, however, we stated that the nested IF can only go seven levels deep, so we would use the VLOOKUP if we had several values levels to set.

In our example, we looked up tax rates based on gross income from our salespeople. Our tax rate table was listed separately in cells I8 through K27. We calculated our salesperson bonus, using the IF statement, then added the bonus to the sales for their gross income. We then used the **VLOOKUP** to calculate the tax amount based on their gross income.

The formula we used was **=VLOOKUP(E8,$I$8:$K$27,3)** where **E8** was the gross income to look up in the first column of the table, **I8:K27** was the table array (our tax rate table), and **3** was the column number in the table of the value we wished to return (in this case column 3 of the table contained our tax rate).

So our VLOOKUP function will look at the gross income amount in E8, then go down the values of the first column of our tax table until it finds the corresponding value range, then it will return whatever percentage rate is on that same row in the third column (tax rate).

Remember, the information in your table needs to be sorted in order in order for the function to return the proper value because it just goes down the first column looking for a value that is not greater than the value you selected.

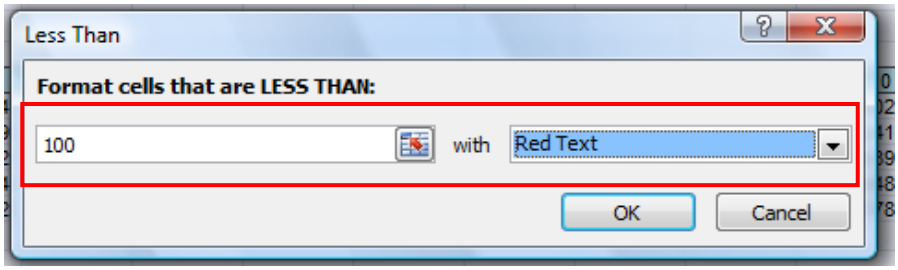
Note: Remember that the table array (I8:K27) must be the same in each formula, so when copying the formula down make sure that the table array is an absolute value in your first formula and then copy. See last section on using absolute values.

CONDITIONAL FORMATTING

Conditional Formatting is used to format cells based on their value. For example, in our Qtr 1 Tab, I applied a conditional format which will display any values less than $100 as Red.

To apply a conditional format, highlight the cells you want the conditional format to apply to. Click the HOME tab in the menu bar and select CONDITIONAL FORMATTING tool in the Styles group. This will open the Conditional Formatting dropdown menu. Select 'HIGHLIGHT CELLS Rules" then select and click "Less Than…" from the cascading menu, this will open the Less Than Conditional Formatting dialogue window.

Enter the value you want to test for. In this example, we entered '100' in the respective field. Next, select the Formatting you wish to apply to these cells. I chose RED TEXT from the drop down list. This set my condition to where Excel will apply the selected format to all cells whose value is less than $100. Click OK.



HYPERLINKS

Hyperlinks create shortcuts or links to another cell, tab, file, etc. In our example, we linked the cells containing our QTR 1, 2, 3, and 4 Sales headings on the Regional Totals Tab to each of the respective individual QTR worksheets.
To insert a hyperlink to another work sheet, select the cell, click **INSERT** tab in the menu bar, select **HYPERLINK** icon. The Insert Hyperlink dialogue box will appear

Choose **'Place in This Document**' on the Link to: navigation pane. The "Or select a place in this document:' field will display all the worksheet tabs in the current workbook. **Click the corresponding tab name. In our example we clicked 'QTR 1'.**

In the **'Text to display:**' field at the top of the dialogue box, enter what you want to display or appear in the selected cell with the hyperlink.

You may also add a **Screen Tip** by clicking the ScreenTip… button in the dialogue box. Type the message you want to display as a screen tip. The screen tip will display when the user hovers the mouse over the cell with the hyperlink.

RESULT: When someone clicks on cell C3, our QTR 1 SALES heading, they will be taken to the QTR 1 worksheet to view all of Quarter 1 details.

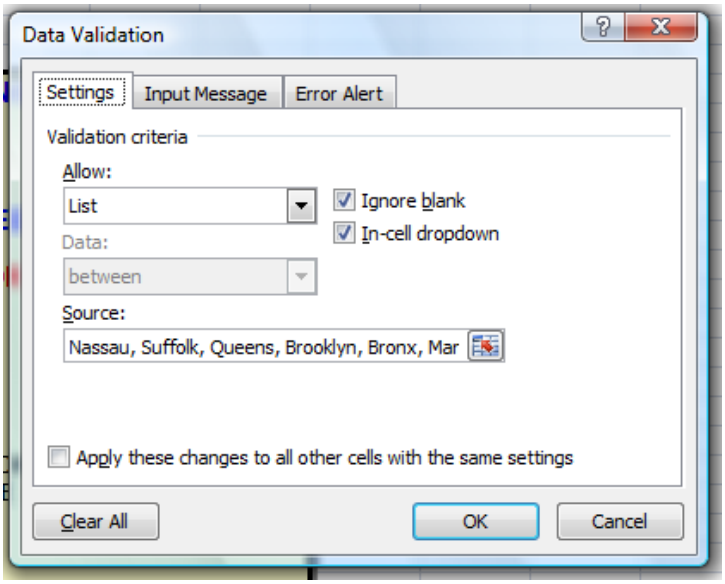
NOTE: The hyperlinked text to display will appear in the cell as a hyperlink (blue underlined text). You must format it if you want it to appear as normal text.

DATA VALIDATION

Data Validation is used when you want to be sure a user will only enter specific values in a cell. This is helpful when you have formulas that test for or count specific values. By using the Data Validation feature you can make certain that each user enters the value exactly the same so the resulting formula calculations will be accurate.

For example, one user may enter QTR 1, another may type Quarter 1, and another may type Quarter One. If a formula was used to look for the values based on QTR 1, then the other entries would not be counted. By using a Data Validation list you can have the user select from a list of values in a drop down list. This insures that any formulas using that field value will be accurate. Another use is to limit or confine the entry to a specific list.

Let's say I want the Location column of a worksheet to be limited to Nassau, Suffolk, Queens, Brooklyn, Bronx, Manhattan, or Staten Island only. I would create a data validation list for the cells in that column.



To create a data validation list, select the cell or cells you want the validation to apply to, click **DATA** tab in the menu bar and select **Data Validation** arrow, and **Data Validation** option from the list. The Data Validation dialogue box appears.
On the Setting tab, enter the validation criteria. For our example, we want to choose **LIST** from the Allow: drop down box list (**1**). Then in the source field, type the required list of values: *Nassau, Suffolk, Queens, Brooklyn, Bronx, Manhattan, Staten Island*, using commas to separate the values. (**2**)
(NOTE: You can also type your list in a column and then select those cells for the source field) Click OK.
Your cell will now display a small black arrow when clicked on, indicating that a drop down list exists for that cell. The user clicks on the arrow and selects a value from the list which you defined.

If the user attempts to type something other than a choice in the list, they will receive an error message which can be defined in the Error Alert tab.

LINKING WORKSHEETS WITH FORMULAS

We created a Total rollup worksheet which linked to our Quarterly Totals for each of our regional areas on the corresponding quarterly worksheets. By linking worksheets, we can easily create total or summary sheets which depict an overall view of our combined worksheets.

To create the link to the Quarter 1 Sales for the Northwest region, we click the cell we want the linked cell total to appear in. In our example, for the Northwest Region's Qtr 1 Sales, we click on cell C4. Once we select the cell, press the equal key **(=)** **(1)** to start our formula in the selected cell.

QUARTERLY SALES BY REGION				
REGION	QTR 1 SALES	QTR 2 SALES	QTR 3 SALES	QTR 4 SALES
NORTHWEST	=			
SOUTHWEST				
MIDWEST				
NORTHEAST				
SOUTHEAST				

After typing the equal sign, navigate to the QTR 1 worksheet **(2)** (click QTR 1 tab), then select the cell with the Northwest Region's Quarter 1 totals **(3)**. In our example, we clicked on cell O9, now hit the ENTER key.

3	PROD 4	PROD 5	PROD 6	PROD 7	PROD 8	PROD 9	PROD 10	PROD 11	PROD 12	TOTAL
.46	$ 978.09	$ 941.61	$ 993.21	$ 336.73	$ 50.70	$ 169.83	$ 561.00	$ 951.44	$ 702.95	$ 7,788.99
.92	$ 907.77	$ 239.68	$ 610.27	$ 394.67	$ 629.60	$ 935.28	$ 188.07	$ 50.88	$ 199.69	$ 6,304.36
.16	$ 958.43	$ 809.77	$ 2.56	$ 202.87	$ 310.31	$ 268.82	$ 97.22	$ 206.01	$ 949.21	$ 5,926.65
.67	$ 103.32	$ 252.79	$ 806.10	$ 740.99	$ 721.52	$ 800.09	$ 101.46	$ 709.38	$ 475.73	$ 6,142.24
.01	$ 404.34	$ 290.34	$ 986.70	$ 296.61	$ 408.94	$ 178.21	$ 283.06	$ 595.07	$ 644.54	$ 6,155.83
										$ 32,318.08

3 3

TALS | QTR 1 | QTR 2 | QTR 3 | QTR 4 | ABSOLUTE

After pressing ENTER, we are directed back to the REGION TOTALS worksheet and our total from cell O9 on the QTR 1 worksheet has now been entered into the Region Totals worksheet.

REGION	QTR 1 SALES	QTR 2 SALES
NORTHWEST	$ 32,318.08	

The formula which was created by our action is =’QTR 1”!O9

ABSOLUTE CELL VALUES

There will be times when we want to copy an existing formula to other cells and **NOT** have certain cells in the formula change as we copy it. By making a portion of the formula Absolute, this portion of the formula will not change as we copy the formula to other cells…it will remain absolute. To make a cell address absolute you can add a $ in front of the row and column (ie: **$C$4**) when typing the formula or you can select the cell in the formula bar and hit the **F4** key.

Additional Resources

Download the worksheet referenced in this manual:

http://stsico.com/files/
Click on Excel3Practice.xlsx