

## Mini Lesson: Cash Budget and Payment Function

Revised August 2016

No Prerequisites Required

A **cash budget** is an estimate of the cash inputs and outputs of a person or a company over a specific period of time. It can be used to project future inputs and outputs or to record past inputs and outputs.

In the next activity, you will be creating a personal cash budget and using the payment function. The **payment function** can be used to calculate the payment for a loan based on constant payments and a constant interest rate.

### How to use the Payment Function:

The syntax for the payment function is  $PMT(\text{rate}, \text{nper}, \text{pv}, \text{fv}, \text{type})$ , where:

rate = interest rate of the loan

nper = total number of payments for the loan

pv = present value or principal

fv = future value or cash value attained after last payment has been made

type = indicates when payments are due

- 0, when payments are due at the end of the period

- 1, when payments are due at the beginning of the period

Click the tab for the worksheet titled Activity 1 to begin.

### Activity 1: Creating a Monthly Budget

Let's say you recently graduated from college with a Bachelor's degree and applied for an entry level position that pays an annual salary of \$50,000 before tax. Complete your Personal Cash Budget for the month of October with the information given below.

- 401(K) contribution: 5% of salary
- FWT: 15% of salary less the 401(k) contribution
- SWT: 5% of salary
- Social Security: 6.2% of salary
- Medicare: 1.45% of salary

For the purpose of this problem, assume that there are 4 weeks in a month and expenditures are allocated equally over 12 months. Your expenses are as follows:

- Rent: \$2133/month split with 3 roommates
- Groceries: \$45/week
- Telephone & Internet: \$80/month

- Cell phone: \$60/month
- Commuting expenses: \$30/week
- Clothing: \$1500/year
- Electricity & Gas: \$80/month
- Entertainment: \$30/week
- Eating out: \$25/week
- Haircut: \$20/bi-week
- Health Insurance: \$2400/year
- Loan repayment: \$2100/year

### Directions:

- a. Create a copy of the current worksheet and rename the worksheet "Activity 1 Solution."
- b. Type in your name in cell A3.
- c. Type in the current year in cell A5.
- d. Enter formula in cell F9 to calculate Salary for the month.
- e. Enter formula in cell E11 to calculate Federal Withholding Tax (FWT).
- f. Enter formula in cell E12 to calculate State Withholding Tax (SWT).
- g. Enter formula in cell E13 to calculate Social Security.
- h. Enter formula in cell E14 to calculate Medicare.
- i. Enter formula in cell E15 to calculate 401(k).
- j. Use AutoSum from cells E11:E15 to calculate Total Withholdings.
- k. Enter formula in cell F17 to calculate Net Pay (Net Pay is equal to the difference between Salary and Total Withholdings).
- l. Calculate monthly expenses in cells E20:E31 using the various expenses given in the activity.
- m. Underline cells E15 and E31.
- n. Use AutoSum from cells E20:E31 to calculate Total Payments.
- a. Calculate either a Surplus or Deficit in cell F34 (this is the difference between Net Pay and Total Payments of Cash). Then, enter in cell A34 whether the budget for the month of October resulted in a surplus or a deficit. *Depending on whether the content in cell F34 is a positive or negative amount, then you can determine whether it is a surplus or deficit.*
- o. Apply Merge and Center to cells A3:I3. Repeat for cells A4:I4 and A5:I5.
- p. Fill color for cell areas A3:I5 to Light Blue.
- q. Format cells F9, E11:16, F17, E20:E31, F32, and F34 to Currency with 2 decimal places, comma separator, and \$ symbol.
- r. Merge and center rows 6, 7, 18, and 33 across columns A through I. Hold down the CTRL Key to select and apply the formatting to the non-contiguous ranges of cells, or format each row separately.
- s. Fill color for cell areas A8:I8, A19:I19, and A35:I35 to Light Grey.

- t. Merge and left align rows 9, 10, and 17 across columns A through E, merge and left align rows 11:16 across columns B through D, and merge and left align rows 20:31 across columns A through D.
- u. Use thick box borders for cell areas A3:I34, A3:I5, A8:I8, A19:I19, and A34:I34.
- v. Change cells A3, A4, A5, A8, F9, F17, A19, F32, A34, and F34 to Bold Font.
- w. Select all cells and set Font to Calibri font size 11.
- x. Save file as Personal Budget XX, where XX are your initials.
- y. Click on the tab for the worksheet titled Activity 2 to continue.

## Activity 2: Cash Budget using the Payment Function

Let's say you are now planning to purchase a car and would like to determine the monthly payments for the vehicle. Use the payment function to determine the monthly payment that you should make in order to purchase a \$17,283 car with zero-down payment, for a 5-year loan with a 4.14% APR, and payments due at the beginning of the period. Then, determine the maximum purchase price of the car.

### Directions:

- a. Create a copy of the current worksheet and rename the worksheet "Activity 2 Solution."
- b. Insert two rows above row 33.
- c. Type in "Car payment" in cell A34.
- d. Calculate monthly car payments in cell F34 using the payment function. The future value of the car is equal to 0 and be sure to divide the APR by 12 since these are monthly payments.
- e. Update the formula in cell F36 to reflect the car payment. *Be careful with your formula! Make sure the value in cell F36 goes down, not up.* Use Undo (hold down on the CTRL and Z key) if you would like to go back.
- f. Merge and center row 33 across columns A through I.
- g. Type "Maximum purchase price of car:" into cell A38, "Estimate 1" in cell A39; "Estimate 2" in cell A40, and "Estimate 3" in cell A41.
- h. In cell D39, enter your first estimate of the maximum amount that could be spent on a car given the same interest rate and repayment period. The maximum amount refers to the maximum price of a car that you would be able to purchase if you used the entire surplus from your budget for the monthly payments, meaning you will be left with a zero surplus or deficit. *Since, the maximum purchase price will be greater than \$17,283, Estimate 1 should reflect that.*
- i. Insert the payment function in cell F39 to calculate the monthly payment based on the estimated maximum purchase price. As a shortcut you can copy and paste the contents of cell F34 into these cells and edit the present value (the maximum purchase price) in the formula bar.
- j. Based on the result of Estimate 1, enter another estimated maximum purchase price in cell D40, then insert the payment function in cell F40 to calculate monthly payment based on the estimated maximum purchase price.

- k. Based on the results of estimates 1 and 2, enter the final estimate in cell D41, then insert the payment function in cell F41 to calculate the monthly payment. *The contents in cell F41 should be as close to \$846.50 as possible. Keep changing the estimate in cell D41 until that is reflected in cell F41.*
- l. Use Format Painter to apply the format of cell E30 to cells D38:D41.
- m. Save file.