**MATH 132 Simple and Compound Interest + Applications**

**Formula Sheet**

Key to Symbols:

**Simple Interest** from Present Value Future Value in a Simple Interest situation

**Compound Interest** (k = 1) **Compound Interest** () **Compound Interest** **Annuities** ()

Lump Sum Payment Making or Receiving Regular Payments :

**Monthly Payment** on a Loan Find the **Regular Payment** (Annuities)

Simple Interest Loan Find the regular payment in compound interest:

**Time** needed to reach a financial goal (compound interest):

**Other SIMPLE INTEREST** formulas... Solve for P, I, r, or t and Banker’s Rule:

Note: Use of ( ) is extremely important!

**Banker’s Rule** with

**Continuously compounded interest** formulas:

Future Value: Interest rate: Time needed:

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**Formula Sheet in Microsoft Excel**

When you use **FUNCTIONS** in Excel, there are specific ***arguments*** ***or inputs*** which are separated by commas, that you must provide so that the function calculates your result correctly.

Here’s what each ***argument*** means in these formulas… Remember: **4%** is either typed **4%** or **.04**, NOT just **4**.

* **rate** is the periodic interest rate. Example: if the annual interest rate is 6% and you make *monthly* loan payments, the periodic **rate** is 6% divided by 12, or .005. In Excel you may enter it as **6%/12** if you like. If you just type **6/12** without the **%**, the calculation will be wrong.
* **nper** is the number of periods. Example: if a 10-year loan has monthly payments, the **nper** argument would be 10 times 12, or 120 periods. You may enter it as 10\*12 and Excel will do the calculation.
* **pv** is the present value of the account or annuity. Example: if you want to borrow $12,345.67, the amount borrowed is **pv**. If making monthly deposits, such as a savings annuity, then **pv** = 0.
* **fv** is the ending value (accrued value) of the account or annuity. This typically is zero for a loan or payout annuity.
* **type** is a code that indicates when payments are due. Please ignore/omit the type argument.
* **pmt** is the regular payment/deposit that is being made, or the regular withdrawal (say, for example, monthly you wish to deposit $200 for 30 years. Then **pmt** is $200).

For **loans**, you may be interested in the following: (usually **fv = 0** unless in a leasing situation)

1. How much can you borrow on a fixed monthly payment? **=**[**PV**](https://support.office.com/en-us/article/pv-function-23879d31-0e02-4321-be01-da16e8168cbd)**(rate,nper,pmt,fv)**
2. What’s the periodic interest rate? **=**[**RATE**](https://support.office.com/en-us/article/rate-function-9f665657-4a7e-4bb7-a030-83fc59e748ce)**(nper,pmt,pv,fv)**
3. What’s the number of remaining periods? **=**[**NPER**](https://support.office.com/en-us/article/nper-function-240535b5-6653-4d2d-bfcf-b6a38151d815)**(rate,pmt,pv,fv)**
4. What’s the ending value? (For car leases, this is the ‘residual’) **=**[**FV**](https://support.office.com/en-us/article/fv-function-2eef9f44-a084-4c61-bdd8-4fe4bb1b71b3)**(rate,nper,pmt,pv)**
5. What’s the periodic (monthly) payment amount? **=**[**PMT**](https://support.office.com/en-us/article/pmt-function-0214da64-9a63-4996-bc20-214433fa6441)**(rate,nper,pv,fv)**

For **savings**, you may be interested in the following:

1. What’s the periodic interest rate? **=**[**RATE**](https://support.office.com/en-us/article/rate-function-9f665657-4a7e-4bb7-a030-83fc59e748ce)**(nper,pmt,pv,fv)**
2. What’s the number of remaining periods for your savings plan? **=**[**NPER**](https://support.office.com/en-us/article/nper-function-240535b5-6653-4d2d-bfcf-b6a38151d815)**(rate,pmt,pv,fv)**
3. What ending amount will you achieve on a fixed deposit schedule? **=**[**FV**](https://support.office.com/en-us/article/fv-function-2eef9f44-a084-4c61-bdd8-4fe4bb1b71b3)**(rate,nper,pmt,pv)**
4. What’s the periodic **deposit** amount when pv=0 toward a **fv** goal? **=**[**PMT**](https://support.office.com/en-us/article/pmt-function-0214da64-9a63-4996-bc20-214433fa6441)**(rate,nper,0,fv)**
5. What’s the periodic **withdrawal** amount when fv=0 from an account with a given **pv**? **=**[**PMT**](https://support.office.com/en-us/article/pmt-function-0214da64-9a63-4996-bc20-214433fa6441)**(rate,nper,pv,0)**

To find the **effective annual yield, nper** = number of compounding periods in 1 year

* Use the Excel formula =[EFFECT](https://support.microsoft.com/en-us/office/effect-function-910d4e4c-79e2-4009-95e6-507e04f11bc4)(**rate,nper**)