Excel Weeks 6-7 Lab – Financial Mathematics Calculator

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The list of inputs inside ( ) provide the function with necessary (and sometimes optional) information with which it performs the required calculation. We refer to the inputs as arguments of a function. An argument is like the domain of a function in algebra. We can’t calculate the square root of a number unless we specify what that number is.

* **rate** – interest rate divided by k; it is also called the periodic rate
* **nper** – number of years \* k; the number of payment periods (which is also the number of compounding periods)
* **pmt** – what we call the “regular payment”, also could be a regular withdrawal or payment on a loan, or deposit into a savings annuity; this value is 0 in a compound interest situation with a lump sum payment
* **pv** – or **[pv]** – the brackets make it optional, but we will treat it as necessary; this is the present value of a loan, savings/payout annuity, or investment
* **fv** – or **[fv]** – we will treat it as necessary despite the [ ]; this is the future value of a loan, savings/payout annuity, or investment
* **[type]** – this is set to either 0 or 1; 0 if the payments occur at the end of the compounding period (which is most common) or 1 if the payments occur at the beginning of the compounding period

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**Exercise #1:** Calculate Present Value of a ***payout annuity*** that involves making regular **monthly** payments

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Once we place the appropriate values in for rate, time (in years), and the payment amount, we calculate the present value with

 We can conclude that the present value is $164,355.

The reason we see “D9/12” is because interest is compounding monthly.

The reason we see “D10\*12” is because payments are made monthly. The number of years is not necessarily the same thing as “NPER = number of periods”. Present value will be negative.

In my own tutorials at [youtube.com/@EZMathTV](mailto:youtube.com/@EZMathTV) the spreadsheet is set up so that we have a box for the value of k. The Present Value, Future Value, and Regular Payment calculations will work with any value of k we provide.

**Exercise #2:** Calculate Future Value of an investment (such as a savings annuity) that involves making a lump sum deposit or borrowing a lump sum which needs to be paid in full at the end.

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**NOTE: This is a lump sum loan! No regular payments/deposits are being made.**

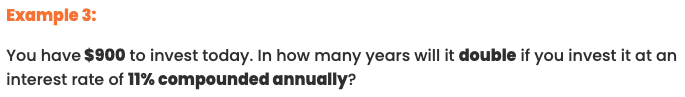
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**Exercise #3:** Sometimes we know how much we want to invest now, or we know how much we will need in the future but are unsure how long it will take. If we know the interest rate we can solve for the time needed by using the NPER() function.



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In this example, NPER is also time in years because interest is compounded annually. Our conclusion then is that it will take about 7 years for the account to double in value.

Side note:

Sometimes NPER calculates payment periods, not time in years. In this example, NPER happens to be the same as time in years. But if the compounding periods (k) are multiple times in a year, we need to do this: **YEARS = NPER(#,#,#,,)/k**

**Exercise #4:** Sometimes we know how much we want to invest now, or we know how much we will need in the future, may even know what our regular payments will be, but we are looking for a favorable rate. We can solve for the interest rate using the RATE() function in Excel.

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**Example 4:**

Let’s find out the interest rate on a home equity loan of $35,000 that involves annual payments for 10 years with an annual payment of $5000.

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**Exercise #5:** Sometimes we want to know what our regular payments need to be to pay off a loan or to reach a financial goal in a certain amount of time. We can calculate the regular payment amount using the PMT() function in Excel.

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