Foundations 12 –Compound Interest and Annuity Notes

This lesson is based off an article on
http://www.tvmcalcs.com/index.php/calculators/excel_tvm_functions/excel_tvm_functions_page1

Warm-up
Use TVM functions to calculate how much money I would need to invest right now at 3.1% per year if I wanted $22,500 for a boat in 40 years (when I retire).

Last lesson we saw a bunch of TVM functions, but we skipped a few details that we need to address. First, we need to talk about compound interest that updates more than once every year.

Ex 1
You are offered an investment at 6.5% interest ***annually***, but they recalculate interest on your investment ***quarterly*** (4 times every year). If you invest $750, how much do you have after 10 years?

Let's look at how we would do this in a spreadsheet

Let's check our work matches the formula below

r^* = _____ (_____)

n^* = _____

$$FV = PV\,(1 + r^*)^{n^*}$$

$$n^* = n \times compounding\ periods\ per\ year \qquad r^* = \frac{r}{compounding\ periods\ per\ year}$$

Annually – _____ times per year

Semi-Annually – _____ times per year

Quarterly – _____ times per year

Monthly – _____ times per year

Weekly – _____ times per year

Daily – _____ times per year

Every Two Weeks – _____ times per year

Semi-monthly – _____ times per year

Basically, we are recalculating interest more than once every year.

Next thing we need to discuss is **annuities**.
An **annuity** is a series of equal payments at regular time intervals

Examples of annuities:

On the sheet from the last lesson, the one function we didn't use helps us find what the annuity payment needs to be. This is useful if you have a savings target in mind and you want to know how much you need to put into your account each month (or week, or year) to get there.

Purpose	Calculator Key (Workbook)	Excel Function
Solve for annuity payment	PMT	**PMT**(**rate**, **nper**, **pv**, *fv*, *type*)

We also need to update what we used last time now that we know about compounding periods.

rate – _EFFECTIVE_ interest rate	**nper** – number of periods _(NOT JUST YEARS ANYMORE)_	**pmt** – payment amount per period
pv – present value	**fv** – future value	**type** – payment at start or end of month (end = 0, start = 1; default is 0)

Ex 2
Use TVM functions to calculate the future value of an investment where you put $60 in a savings account at the start of each week for 3 years at 4.1% per year compounded weekly.

For this question, we are solving for the _____ and we will be using the _____ function.

Answer: _____

Ex 3
You have $500 in a savings account at 3.9% per year compounded quarterly and you want to save up for a vacation in 3 years that is going to cost $6,000. How much will you need to put into the account at the end of each quarter?

For this question, we are solving for the _____ and we will be using the _____ function.

Answer: _____