Annuities

A series of equal investments or payments at regular time periods is called an annuity. Annuities are commonly found in both savings and loans.

Examples: mortgages, car payments, student loan payments, savings plans

Example 1: How much would you have to save monthly, starting now, to have a million dollars by the time you retire? Assume the interest rate is 7% per year, compounded monthly.

Scenario 1: Retire at 55
N=
I%=
PV=
PMT=
FV=
P/Y=
C/Y=
PMT: END BEGIN

Scenario 2: Retire at 60
N=
I%=
PV=
PMT=
FV=
P/Y=
C/Y=
PMT: END BEGIN

Scenario 3: Retire at 65
N=
I%=
PV=
PMT=
FV=
P/Y=
C/Y=
PMT: END BEGIN

Example 2: How much will those student loans really cost me?!

The amortization period for student loans is typically 15 years. Suppose you borrow a total of $20 000 and the interest rate is 7.5%, compounded monthly.

First, calculate your monthly payment:
N=
I%=
PV=
PMT=
FV=
P/Y=
C/Y=
PMT: END BEGIN

Next, calculate the total amount you will have to re-pay:

How much interest would you pay?

Example 3: Saving for a Major Purchase

If you deposit $300 per month into an account that pays 3.6% per year, compounded annually, how much will you have saved after 2 years?

N=
I%=
PV=
PMT=
FV=
P/Y=
C/Y=
PMT: END BEGIN

Example 4: Re-paying a Car Loan

Suppose you buy a used car and agree to pay it off over 1 year. The bank calculates your payments as $229.19/month at an interest rate of 10.5% per year, compounded monthly.

What is the actual cost if you were to pay cash for the car today?

N=
I%=
PV=
PMT=
FV=
P/Y=
C/Y=
PMT: END BEGIN

How much interest will you pay if you choose the payment plan?

Example 5: Determine the weekly deposit needed to save $3000 in three years if interest is earned at 2.5% compounded daily.

N=
I%=
PV=
PMT=
FV=
P/Y=
C/Y=
PMT: END BEGIN

Payment Periods/Compounding Periods:

Annually: _____ time per year
Semi-annually: _____ times per year
Quarterly: _____ times per year
Monthly: _____ times per year
Weekly: _____ times per year
Daily: _____ times per year