Annuities: Investments + Loans

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Investments:

1. Savings Accounts .05% - 1%
2. Term Deposits 2 - 3%
3. Bonds 2 - 4%
4. Mutual Funds - pool $ with other investors & an expert buys stocks.
5. Stocks (shares)
6. RESP - registered education savings plan
   RRSP - registered retirement savings plan

Loans

1. Credit Card 20%
2. Line of Credit prime + 4% (3.5)
3. Student Loans (6 - 9%)
4. Car loans
5. Mortgages.

You put $100/mo in a RRSP that earns 5% interest compounded monthly. How much would you have after 2 years.

$$A = \frac{R\left[(1+i)^n - 1\right]}{i}$$

A = amount in $ (FV future value for investments

R = amount you regularly invest (or pay)

i = interest rate per compounding period (in decimal)

n = # of deposits / payments

$$A = \frac{R\left[(1+i)^n - 1\right]}{i}$$

$$A = \frac{100\left[\left(1+\frac{.05}{12}\right)^{24} - 1\right]}{\frac{.05}{12}}$$

$$A = \frac{100\left[(1.041\overline{6})^{24} - 1\right]}{.041\overline{6}}$$

$A = 2518.59$ $\quad 24 \times 100 = 2400$

Say you want to retire at 65 with 1,000,000. At age 25 you start investing in a mutual fund that pays 4% compounded monthly. How much should you deposit monthly to reach your goal?

$$A = \frac{R\left[(1+i)^n - 1\right]}{i}$$

$$1{,}000{,}000 = \frac{R\left[\left(1+\frac{.04}{12}\right)^{480} - 1\right]}{\frac{.04}{12}}$$

$$(.00\overline{3})1{,}000{,}000 = \frac{R\left[(1.00\overline{3})^{480} - 1\right]}{.00\overline{3}}(.00\overline{3})$$

$$\frac{3333.3\overline{3}}{3.93987} = \frac{R[3.93987]}{3.93987}$$

$\$846.05 = R$

With loans $A = PV$ (present value)

$$PV = \frac{R\left[1 - (1+i)^{-n}\right]}{i}$$

n = # of payments.

Eg You buy a TV + pay $80/mo for 36 months @ 10% compounded monthly. Find PV (total that you owe).

$$PV = \frac{80\left[1 - \left(1 + \frac{.10}{12}\right)^{-36}\right]}{\frac{.10}{12}}$$

$$PV = 2479.30$$

$36 \times 80 = \underline{2880}$ $\quad 2880 - 2479.30 =$ $400.70 interest

Mortgage is a loan for property / house
All mortgages in Canada are compounded semi-annually but are usually paid monthly semi-monthly or bi-weekly. To adjust for the formula where compounded / payment periods are different the interest is adjusted.

This converted rate is called the <u>effective interest rate</u>.

You get a mortgage of $400,000 for 25 years with an effective interest rate of

3.9% compounded monthly. What is the monthly payment.

$$PV = \frac{R\left(1-(1+i)^{-n}\right)}{i}$$

$$400{,}000 = \frac{R\left(1-\left(1+\frac{.039}{12}\right)^{-300}\right)}{\frac{.039}{12}}$$

$$400{,}000 = \frac{R\left(1-(1.00325)^{-300}\right)}{.00325}$$

$$\frac{1300}{.6222} = \frac{R(.6222)}{.6222}$$

$\$2089.32 = R$

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(6) $$7000 = \frac{R\left(\left(1+\frac{.0195}{4}\right)^{20}-1\right)}{\frac{.0195}{4}}$$

CMHC Fees.

↳ Canadian Mortgage + Housing Corporation.

5% - 9.99% → 4% fee

100,000 + 4000 = 104,000