

1. Consider to buy a house. The current price is \$375,000.00. One year later the price will be \$400,000.00 and you will sell the house after one year. What is the Present Value of your investment if the opportunity costs are 3.5 %? [11,473.43]
2. Calculate the Present Value of the future cash flows. You buy a stock. The price is now (t=0) \$20. Every year you will obtain certain dividend payment in 10% of the price in time t=0. After five years you will sell the stock for \$22. What is the cumulative net present value of your investment? There will be an alternative investment in government bonds which pay every year 4 % coupon (=opportunity costs) [6.986041]
3. What will be the Present Value in three years - PV(3)? [7.858346]

Hint

$$-20*(1+0,04)^3+2*(1+0,04)^2+2*(1+0,04)^1+2*(1+0,04)^0+2/(1+0,04)^1+24/(1+0,04)^2 = 7.858346$$

or,

$$6.986041*(1+0,04)^3 = 7.858346 \text{ or,}$$

Discounting (multiplication) the Future Value by the discount factor - $1/(1+0,04)^2$

4. Calculate the Future Value of all cash flows. [8,499587]
5. How long must you keep your money at a bank account if you invest \$1,000.00 and after some time you will obtain \$1,402.25? The interest period is twice a year (6 months)* and the annually interest rate is 3.2 %. Maximize your utility (=combined interest - compound and simple).

$$1,402.25 = 1,000.00*(1+0,035/2*)^t$$

$$t = \ln(1,402.25/1,000.00)/\ln(1+0.032/2)$$

t = 21.29847243 → for sure 21 interest periods! (a little bit more than 10 years). Now we know that for 21 interest periods we will use the compound interest. There is just remaining the time for less than one interest period (simple interest).

$$1,402.25 = (1,000.00*(1+0,035/2*)^21)*(1+0.032*R)$$

$$R = ((1,402.25/1,000.00*(1+0,035/2*)^21)-1)/0.032$$

$$R = 0.148406 \rightarrow 0.148406*360 \text{ (days a year)} = 53.426 \rightarrow 54 \text{ days.}$$

Answer: We have to keep our \$1,000.00 10 years, 7 months and 24 days on the bank account to obtain \$1,402.25.