U7D4 Present Value Annuities

Example 1:

How much money do you need to have saved at age 18 if you want to be able to withdraw \$3000 every year from age 19 to age 21, inclusive? Assume an interest rate of 2.5%/a compounded annually. Use a timeline.

NOTE:



Example 2: (Same as Ex. 1 with formula)

Use the formula: $PV = \frac{R[1-(1+i)^{-n}]}{i}$

PV is the Present Value of the annuity (the amount of money needed at age 18 to make the withdrawals in the future)

R = i = n = PV = ?

Example 3. Calculate your car payments if you have borrowed \$10,000 for 4 years, with an interest rate of 4.8%/a compounded monthly and your payments are monthly at the end of the month.

Use the formula: $PV = \frac{R[1-(1+i)^{-n}]}{i}$ where you are solving for R, PV is the Present Value of the annuity (the amount of money borrowed in this case). Check with technology. (google fncalculator)

R = ? i = n = PV =

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Example 4. You want to retire with \$650000. Find the amount you must deposit monthly for 40 years if your retirement investment fund (RIF) earns 6.4%/a compounded monthly. Assume you are depositing your money at the end of the month.

Use the accumulated value annuity formula and solve for R. Check with technology. (google fncalculator)

<u>Recall</u>: $A = \frac{R[(1+i)^n - 1]}{i}$

Solve numbers 1 &2 with a timeline and the formula and 3 & 4 with the annuity formulas.

- 1. Find the future value of \$600 deposited at the beginning of each year for 3 years at an annual interest rate of 6% compounded monthly. Answer: \$1913.30
- Find the present value of a series of regular \$1000 withdrawals from an investment account earning 5%/a compounded monthly. Assume you are withdrawing \$1000 per year for 4 years at the end of the year. Answer: \$3536.40

 Find the amount borrowed (present value) if you are making car loan payments of \$350/month for 5 years. The interest rate is 1%/a compounded monthly. Answer: \$20 475.32

 If your parents deposit \$50 every month into an education fund, for 15 years, how much will be in the account at the time of the last deposit. Interest rate is 6%/a compounded monthly. Answer: \$14 540.94