Answer on Question #76253 – Math – Financial Math

Question

At age 21 Julio begins saving $1,250 each year until age 35 (15 payments) in an ordinary annuity paying 5.7% annual interest compounded yearly and then leaves his money in the account until age 65 (30 years). His friend Max begins at age 41 saving $2,500 per year in the same type of account until age 65 (25 payments). How much does each have in his account at age 65?

Solution

In the first year Julio's saving $\$1,250+\$1,250*0.057=\$1,250*(1+0.057)=\$1,250*1.057$
In the second year Julio's saving $\$1,250*1.057*1.057=\$1,250*1.057^2$
In the nth year Julio's saving $\$1,250*1.057^n$

In this way, in 15 year Julio saving: $\sum_{i=1}^{15} 1250*1{,}057^{i}$

We use the formula to find the sum of the terms of a geometric progression:

$1+g+g^2+\ldots+g^n=b1*\frac{(g^n-1)}{g-1}$, где g – ratio, b1 – the first term.

Then $\sum_{i=1}^{15} 1250*1{,}057^{i} = 1250*1.057*\frac{(1{,}057^{15}-1)}{1{,}057-1}=\$30{,}060$

This amount will be multiplied over 30 years in $1{,}057^{30}$ time. In this way Julio saving $30{,}060*1.057^{30}=\$158{,}576$.

And Max by the same formulas will receive:

$\sum_{i=1}^{25} 2500*1{,}057^{i}=2500*1{,}057*\frac{(1{,}057^{25}-1)}{1{,}057-1}=\$139{,}079.$

Answer: Max saving $139,079, a Julio $158,576.