

A man deposits \$5000 at the beginning of each year for 12 years in an account earning 3% per year compounded annually. At the end of that time, he puts the total amount from the account into another account that earns 5% compounded quarterly for 5 years. How much has he accumulated over the 17 year period.

Deposit \$5000 each year in an account earning 3% annually that is compounded annually for 12 years

Since regular payments are made each year at the beginning of the year, this is an annuity due.

$$\begin{aligned}PMT &= 5000 \\i &= 0.03 \\n &= 12\end{aligned}$$

Annuity Due

$$\begin{aligned}FV &= PMT \left[ \frac{(1+i)^{n+1} - 1}{i} \right] - PMT \\&= 5000 \left[ \frac{1.03^{13} - 1}{0.03} \right] - 5000 \\&\approx 73,088.95\end{aligned}$$

73,088.96

Deposit the future value in an account earning 5% annually that is compounded quarterly for 5 years

Since no additional payments are made, the future value of the first account earns compound interest.

$$\begin{aligned}PV &= 73,088.96 \\i &= \frac{0.05}{4} \\n &= 4 \cdot 5\end{aligned}$$

Compound Interest

$$\begin{aligned}FV &= PV (1+i)^n \\&= 73088.95 \left( 1 + \frac{.05}{4} \right)^{20} \\&\approx 93,702.76\end{aligned}$$

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