EXAM FM QUESTIONS OF THE WEEK

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Question 3 - Week of August 8

An account was opened on January 1, 1999 with a deposit of $12,000.

Additional deposits of $100 each were made to the account on the last day of each month for 5 years, with the first of those deposits occurring on January 31, 1999.

Withdrawals from the fund of $1000 each on the first day of each quarter are scheduled to start on January 1, 2006. No other deposits or withdrawals are made.

The interest rate is at a nominal annual rate of 8% compounded monthly.

Find the balance in the fund on December 31, 2010.

The solution can be found below.

Question 3 Solution

The monthly compound interest rate is $\frac{.08}{12} = .00667$.

The quarterly compound interest rate is $j = (1.00667)^3 - 1$.

We wish to find the balance on December 31, 2010, which is 12 years after the fund is created on January 1, 1999. The balance is found by accumulating deposits and subtracting accumulated withdrawals. The initial deposit accumulates for 12 years. The 5 years of deposits continue to accumulate with interest for 7 years after they end on December 31, 2003. There are 20 quarterly withdrawals made up to one quarter before 12/31/2010 . The balance on 12/31/2010 (12 years after 1/1/99) is

$$12,000(1.00667)^{144} + 100 s_{\overline{60}|.00667}(1.00667)^{84} - 1000 \ddot{s}_{\overline{20}|j} = 19,261 .$$