

EXAM FM QUESTIONS OF THE WEEK

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Week of July 23/07

On the first day of each month, starting in May, 2007 Smith deposited \$1000 into a bank account. During 2007 the account earned a nominal annual rate of interest of 6% compounded monthly. During 2008 the account earned a nominal annual rate of discount of 6% compounded monthly. On December 1, 2008 Smith made his last monthly deposit. Find the balance in Smith's account on December 31, 2008 after interest is credited to the account.

- A) Less than 21,000 B) At least 21,000 but less than 21,100
C) At least 21,100 but less than 21,200 D) At least 21,200 but less than 21,300
E) At least 21,300

The solution can be found below.

Week of July 23/07 - Solution

The balance on December 31, 2007 just after interest is credited is

$$\begin{aligned} 1000\ddot{s}_{\overline{8}|@ \text{ interest rate } .005} &= 1000(1.005)^8 s_{\overline{8}|@ \text{ interest rate } .005} \\ &= 1000(1.005) \frac{(1.005)^8 - 1}{.005} = 8182.12 . \end{aligned}$$

This amount will grow during 2008 to an amount of

$$8182.12(1 + .005)^{-12} = 8689.38 \text{ on December 31, 2008 .}$$

This is the accumulated value on Dec. 31, 2008 of the 8 deposits made in 2007.

The accumulated value of the 12 deposits made in 2008 is

$$1000\ddot{s}_{\overline{12}|@ \text{ discount rate } .005} = 1000 \frac{(.995)^{-12} - 1}{.005} = 12,339.27 .$$

The total account balance on December 31, 2008 is 21,088.65 .