

EXAM FM QUESTIONS OF THE WEEK

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Week of January 7/08

The nominal annual interest rate compounded quarterly is Q and the equivalent nominal annual discount rate compounded quarterly is R . You are given that $Q - R = .001203931$.

Find the annual force of interest that is equivalent to these rates. The rates are all positive.

The solution can be found below.

Week of January 7/08 - Solution

The quarterly interest rate is $\frac{Q}{4}$ and the equivalent quarterly discount rate is $\frac{R}{4}$. Since the rates are equivalent, we have $\frac{R}{4} = \frac{Q/4}{1 + \frac{Q}{4}}$, so that $(1 + \frac{Q}{4}) \times R = Q$.

This equation can be written as $(1 + \frac{Q}{4}) \times (Q - .001203931) = Q$, which can then be written as $Q^2 - .00123931Q - .004815725 = 0$. Solving this quadratic equation results in $Q = .07$ or $-.0688$. Since the rates are positive, we ignore the negative rate.

The quarterly rate of interest is $\frac{Q}{4} = .0175$, and the annual force of interest is $4 \times \ln(1.0175) = .0694$.