UNIVERSITY OF TEXAS AT AUSTIN

Quiz #1

The constant force of interest.

Please, provide your **final answer only** to the following questions:

Problem 1.1. (5 points) *Source: SoA Sample set 1984, Problem #6.*
Two funds are started with equal deposits at time-0.

Fund A is credited with simple interest at rate i.

Fund B is credited with compound interest at rate i. The equivalent force of interest is denoted by δ.

Find an expression for the time $t^*, 0 < t^* < 1$, at which the difference between Fund A and Fund B is greatest.

(a) $i - \delta$
(b) $\frac{i}{\delta} - 1$
(c) $\ln(i/\delta)$
(d) $\frac{1}{\delta} \ln\left(\frac{i}{\delta}\right)$
(e) None of the above.

Problem 1.2. (5 points) *Source: CAS May 1986, Problem #2.*
It takes 11.553 years for an initial investment to double at a constant force of interest δ. How long will it take for an initial investment to triple at a nominal rate of interest $i^(2)$ convertible semiannually and numerically equivalent to δ, i.e., such that $i^{(2)} = \delta$?

(a) Less than 19 years.
(b) At least 19 years, but less than 19.5 years.
(c) At least 19.5 years, but less than 20 years.
(d) At least 20 years, but less than 20.5 years.
(e) None of the above.

Problem 1.3. (5 points) *Source: SoA Exam, May 1989, Problem #4.*
Two funds, X and Y, are started with equal deposits at time-0.

Fund X accumulates at a constant force of interest of 5%.

Fund Y is credited with a nominal rate of interest x compounded semiannually.

At the end of eight years, Fund X is 1.05 times as large as Fund Y. Find x.

(a) 0.022
(b) 0.023
(c) 0.042
(d) 0.044
(e) None of the above.