FINANCIAL MATHEMATICS
(STAT 2032 / STAT 6046)

TUTORIAL EXERCISES WEEK 4

Question 1
12 payments of $2,000 each are made at 2-year intervals. Find the value of the series
  (a) 2 years before the first payment at annual effective interest rate $i = 0.08$,
  (b) 8 years before the first payment at nominal annual interest rate $i^{(2)} = 0.08$,
  (c) at the time of the final payment at nominal annual discount rate $d^{(4)} = 0.08$,
  (d) 18 months after the final payment at nominal annual interest rate $i^{(8)} = 0.08$, and
  (e) at the time of the first payment at nominal annual interest rate $i^{(4/3)} = 0.08$.

Question 2
Since June 30, 2010 Smith has been making deposits of $100 each into a bank account on the last day of each month. For all of 2010 and 2011 Smith's account earned nominal interest compounded monthly at an annual rate of 9%. For the first 9 months of 2012 the account earned $i^{(12)} = 0.105$, and since then the account has been earning $i^{(12)} = 0.12$. Find the balance in the account on February 1, 2013.

Question 3
An $m+n$ year annuity of 1 per year has $i = 7\%$ during the first m years and has $i = 11\%$ during the remaining n years. If $s_{\overline{m}|0.07} = 34$ and $s_{\overline{n}|0.11} = 128$, first find n and then find the accumulated value of the annuity just after the final payment.

Question 4
In return for an investment of $1000 in a fixed interest security, you will receive $40 at the end of each half year plus your money back on redemption in 12 years. You intend to deposit all of the proceeds in a bank account that will pay an effective rate of interest of 8% per annum.

How much money will be in the bank account after 10 years?

Question 5
Calculate the present value at January 1, 1999 of payments \$100 on the 1st day of each quarter during calendar years 2001 to 2010 inclusive.

Assume effective rates of interest of 8% per annum until December 31, 2005 and 6% thereafter.

Question 6
State if the following expression is true or false. Show any working used to solve the question.

$$s_{\overline{m-n}|} = v^n s_{\overline{m}|} - a_{\overline{n}|} \qquad \text{where } 0 < n < m$$

Past Exam Question – 2005 Final Exam Q1(b)(i)

Prove the following equality $a_{\overline{n}|}^{(1/k)} = \dfrac{k}{s_{\overline{k}|}} a_{\overline{n}|}$ (2 marks)