ASSIGNMENT 1 For handing in on 24 January 2002

Write your name and student number at the top of your assignment before handing it in. Staple all pages together. Post the assignment in the blue post-box on the second floor in the Maths building before 9:45 on Thursday.

This assignment is based on the material covered in Lectures 1 - 3. Additional reading: Mc-Cutcheon and Scott, pp. 1 - 7 and pp. 10 - 18.

Give all your numerical answers to 4 decimal places. When interest rates are concerned, give your answers in the form of percentage.

- 1. The effective annual rate of interest on a certain building society account is at present 6%, but in the two years' time it will be reduced to 4% and then it will not change over a further 3 years' period. Find the accumulation in the five years' time of an investment of $\pounds 1,000$ in this account.
- 2. The annual rate of interest on local authority deposits for a term of one month, as quoted by Financial Times on 11 January 2002, is $3\frac{3}{4}$ %. According to this rate, what is the one month's accumulation of an investment of £1,000?
- 3. The *nominal* annual rate of interest compounded quarterly is 12%. Find the corresponding *effective* annual rate of interest and the force of interest.
- 4. The force of interest per unit time, δ , is 0.18. Find the *nominal* annual rate of interest on deposits for a term of (a) one day, (b) one month, (c) one year.
- 5. Suppose you want to deposit a certain amount of money in a savings account with the intention to withdraw the initial deposit and interest in one year's time. You are offered to choose between two accounts. Account A pays interest on deposits *monthly* at the rate 6.32% p.a. Account B pays interest on deposits *quarterly* at the rate 6.35% p.a. What is your choice?
- 6. The force of interest varies with time and is given by $\delta(t) = 0.06 + \frac{1}{10+t}$ for $0 \le t \le 1$. Find an analytic expression for the accumulation at time *t* of one unit of money invested at time t = 0. Find $i^{(12)}(\frac{1}{2})$, the nominal rate (per unit time) of interest that applies from $t = \frac{1}{2} = \frac{6}{12}$ to $t = \frac{7}{12}$.