MAT205 – Exam 1 – Spring 2005

1) (16 points) Find the amount which must be invested in order to accumulate $900 at the end of 10 years at:

a) Simple interest of 5% per annum

b) Compound interest of 5% per annum

c) Simple discount of 5% per annum

d) Compound discount of 5% per annum

2) (8 points) a) Find i5 if the rate of simple interest is 10%

b) Find i5 if the rate of simple discount is 10%

3) (17 points) Find the accumulated value of 1 at the end of one year when borrowing from each of the following, then decide from which lender to borrow.

a) (4 points) Lender A: Charges 12% payable in advance and convertible monthly

b) (4 points) Lender B: Charges a discount rate of 11% compounded once every two years

c) (6 points) Lender C: calculates the accumulated value using a force of interest δt=t

(3 points) From which lender should you borrow and why?

4) (15 points) A sum of $9000 was deposited in a bank at 6% simple interest on June 3, 1998, It was withdrawn on March 5, 1999. Find the amount of interest earned assuming:

a) Exact simple interest (actual/actual)

b) Ordinary simple interest (30/360)

c) The Banker’s Rule

5) (8 points) Find the level effective rate of interest over a three-year period which is equivalent to an effective rate of discount of 6% the first year, 5% the second year, and 4% the third year

6) (10 points) In return for three payments of $5000 at the end of years 3, 4 and 10, an investor agrees to pay a certain amount immediately and to make an additional payment of $5000 at the end of year 2. Find the payment he needs to make immediately if the nominal rate of interest is 8% convertible semi-annually.

7) (16 points) An investor makes three deposits into a fund. He deposits $1000 at the end of six years, $2000 at the end of 15 years and $3000 at the end of 30 years

a) (5 points) Find the size of the fund at the end of 40 years if the effective rate of interest is 10 %

b) (5 points) Find the present value of the fund if the effective rate of discount is 10%

c) (6 points) Use the method of equated time to determine the time at which he could have made one payment of $6000 instead of the three separate payments

8) (10 points) Find the length of time necessary for an investment to double if invested at 8% per annum compounded quarterly:

a) By solving exactly

b) By using linear interpolation