

Ex 1 Show that $i^{(m)}$ tends to δ as m tends to infinity.

Ex 2 By direct computation verify that $\bar{a}_{n,i} + \delta \int_0^n \bar{a}_{t,i} dt = n$. Give a verbal interpretation.

Ex 3 A loan of 7000 is to be repaid by four annual payments; 1000 at $t = 1, 2$ and 3000 at $t = 3, 4$. Determine the effective annual interest rate on the loan.

Ex 4 A mortgage for 60,000 is to be paid with equal monthly payments for 20 years at $i = 7.5\%$. Fixing all payments to the nearest cent, draw up a partial amortization schedule for the payments in the first three months and the last three months of the period of the mortgage.

Ex 5 A mortgage at $i^{(12)} = 12\%$ calls for monthly payments of 800 for 15 years with the first payment due one month from now. An option in the mortgage allows the payment of an additional 800 on each anniversary date. If this extra payment is made each year, when will the mortgage be paid off?

Ex 6 A 10,000 par value ten year bond at 8% with semiannual coupons is callable at par at $t = 8, 9, 10$.

(a) Find the price to yield 6% convertible semiannually.

(b) Find the price to yield 10% convertible semiannually.

Ex 7 An asset costing 10,000 has a salvage value of 3000 after 15 years. The book value is determined by depreciating the asset using the compound interest method with an interest rate of 5% per annum. At the end of the tenth year, the depreciation method is changed to the straight line method for the remaining five years. Determine the book values of the asset at the ends of the eighth and twelfth years.

FACULTY OF SCIENCE

FINAL EXAMINATION

MATHEMATICS 189-329B

THEORY OF INTEREST

Examiner: Professor T. Robart

Date: Friday, April 18, 1997

Associate Examiner: Professor J. Turner

Time: 2:00 P.M. - 5:00 P.M.

INSTRUCTIONS

Ordinary calculators permitted.

This exam comprises the cover and 1 page of questions.