MATH 2600/STAT 2600, Theory of Interest
FALL 2014
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Homework Sheet 3
Due: Thursday 9th October: 11:30 AM

1. A loan of \$25,000 at $j_4 = 8\%$ is amortised with equal quarterly payments for 4 years.

   (a) Calculate the monthly payments.

   (b) Draw up a complete amortisation schedule for the loan.

2. Mrs. Quine takes out a 25-year mortgage for a loan of \$1,400,000 at $j_2 = 5\%$.

   (a) Calculate the monthly payments required.

   (b) After 5 years, the interest rate increases to $j_2 = 5.5\%$, calculate the new monthly payments if she wishes to keep the mortgage over 25 years.

   (c) If instead, she wishes to keep the mortgage payments the same, when will she finish paying off the mortgage?

3. Mrs. Roberts borrows \$8,000 for one year at 7% simple interest. After 3 months, she repays \$3,000. How much does she need to pay 6 months after the start of the loan, to pay off the debt.

   (a) If the loan is calculated using the U.S. rule?

   (b) If the loan is calculated using the Merchant's rule?

4. Mr. Smith buys a cottage with a downpayment of \$50,000 and a 15-year mortgage for the remaining \$200,000 at $j_2 = 4\%$. There is a penalty of three times monthly interest on the outstanding balance for paying off the loan early. After 2 years, another company offers him a chance to refinance at $j_2 = 3.4\%$ for the remaining 13 years of the loan. Should he refinance?

5. Mr. and Mrs. Thorpe buys a house in the US. They need to borrow \$300,000 at $j_{12} = 5.2\%$, amortised over 25 years. There is also a financing fee of \$5,000. What is the APR for this loan?

6. A bank lends \$500,000 to Mrs. Underhill. The loan is payed back with monthly interest-only payments at $j_{12} = 6\%$, with the principal returned as a lump sum after 20 years. After 8 years, the bank sells the loan to a private investor, who wishes to achieve an annual effective yield of 5.4%.

   (a) How much does the investor pay for the loan?

   (b) If the bank wants to make an annual effective return of 5.3% on its investment, what annual effective yield would the buyer receive?

(i) 6.21%

(ii) 6.89%

(iii) 7.24%

(iv) 7.53%

7. Mrs. Vickers borrows \$300,000 to invest in the stock market. She has two options for repayment. She can either amortise the loan over 25 years at $j_{12} = 4\%$, or she can make interest only payments at $j_{12} = 4.4\%$ for 25 years, then pay off the balance with a lump sum payment at the end of the 25 years. What rate of return does she need on her investments to make the interest-only payments the better deal?

(i) 4.80%

(ii) 5.40%

(iii) 5.76%

(iv) 6.04%