

MATH 2600/STAT 2600, Theory of Interest

FALL 2013

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Homework Sheet 3

Due: Thursday 10th October: 11:30 AM

1. A loan of \$15,000 at $j_{12} = 10\%$ is amortised with equal monthly payments for 2 years.
 - (a) Calculate the monthly payments.
 - (b) Draw up a complete amortisation schedule for the loan.
2. Mrs. Slater takes out a 20-year mortgage for a loan of \$400,000 at $j_2 = 6\%$.
 - (a) Calculate the monthly payments required.
 - (b) After 5 years, the interest rate drops to $j_2 = 5\%$, calculate the new monthly payments if she wishes to keep the mortgage over 20 years.
 - (c) If instead, she wishes to keep the mortgage payments the same, when will she finish paying off the mortgage?
3. Mr. and Mrs. Thomas buy a cottage, with a downpayment of \$50,000 and a 15-year mortgage for the remaining \$150,000 at $j_2 = 5\%$. There is a penalty of three times monthly interest on the outstanding balance for paying off the loan early. After 3 years, another company offers them a chance to refinance at $j_2 = 4.4\%$ for the remaining 12 years of the loan. Should they refinance?
4. Mrs. Upson buys a house in the US. She needs to borrow \$400,000 at $j_{12} = 6.4\%$, amortised over 20 years. There is also a financing fee of \$4,000. What is the APR for this loan?
5. Mrs. Valdez borrows \$300,000 to invest in the stock market. She has two options for repayment. She can either amortise the loan over 20 years at $j_{12} = 3\%$, or she can make interest only payments at $j_{12} = 3.4\%$ for 20 years, then pay off the balance with a lump sum payment at the end of the 20 years. What rate of return does she need on her investments to make the interest-only payments the better deal?
6. A bank lends \$400,000 to Mr. and Mrs. Wilson. The loan is paid back with monthly interest-only payments at $j_{12} = 5\%$, with the principal returned as a lump sum after 25 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 4.8% on its investment, what annual effective yield would the buyer receive?

7. Mr. Young borrows \$8,000 for one year at 7% simple interest. After 3 months, she repays \$3,000.
- (a) If the loan is calculate using the U.S. rule, how much does she need to pay 6 months after the start of the loan, to pay off the debt.
 - (b) She makes this payment, but the terms of the loan actually say that the Merchant's rule is the applicable rule. What happens at the end of the year, when the loan is due for settlement?