

MATH 210 THEORY OF INTEREST SPRING 2016
PROFESSOR WANG

Homework 8 (max. points = 10)
Due at the beginning of class on Thursday, April 7, 2016

You are encouraged to work on these problems in groups of no more than 4. However, each student must hand in her/his own answer sheet. Please show your work enough to show that you understand how to do the problem -and circle your final answer. Full credit can only be given if the answer and approach are appropriate. Please give answers to two decimal places -e.g., $xx.xx\%$ and $\$xx,xxx.xx$.

Section 5.2. (1) (2)

Section 5.3. (1) (5)

Section 5.4. (2) (3)

Additional Problems.

1. You repay a loan with payments of 1 at the end of each year for 20 years. The amount of interest paid in period t plus the amount of principal repaid in period $t + 1$ equals X . Find X .
2. Tom, Jenny and Chris each borrow 8000 for 10 years at a nominal interest rate of 8%, compounded semi-annually. Tom has interest accumulated over 10 years and pays all the interest and principal in a lump sum at the end of 10 years; Jenny pays interest at the end of every half-year as it accrues and the principal at the end of 10 years; Chris repays his loan with 20 level payments at the end of every half-year period. Find the total amount of interest paid on all three loans.
3. Jon borrows X for 10 years at an annual effective interest rate of 12%. He can repay this loan using the amortization method with payments of 1,600 at the end of each year. Instead Jon repays the X using a sinking fund that pays an annual effective interest rate of 13%. The deposits to the sinking fund are equal to 1,600 minus the interest on the loan and are made at the end of each year for 10 years. Find the balance in the sinking fund immediately after repayment of the loan.
4. You take out a 30-year \$650,000 mortgage at an effective annual interest rate of 8%. Immediately after your 10th payment, you make an additional principal repayment of \$50,000, and then refinance the outstanding balance with a new 15-year mortgage at a 5% effective annual interest rate. Both mortgages require annual year-end level amortization payments. Find the amount of interest in the 7th payment of the new mortgage.