

MATH 2600/STAT 2600, Theory of Interest

FALL 2010

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Homework Sheet 1

Due: Thursday 30th September: 1:00 PM

1. Calculate the accumulated value on maturity of the following investments:
 - (a) \$1,000 invested for 3 months at 5% simple interest.
 - (b) \$200 invested on 16th August 2007 and maturing on 4th March 2008, at 7% exact simple interest. (NB. 2008 is a leap year.)
 - (c) \$1,000,000 invested on 12th May 2009 and maturing on 6th June 2009 at 6% ordinary simple interest.
2. A man invests \$1,000 at 12% exact simple interest on 7th March.
 - (a) On what date does he have enough money to buy a computer which costs \$1,100 (including taxes)?
 - (b) How much money does he have left over if he buys the computer on that day?
3. A businessman receives an invoice for \$700, with terms 2/10 n/50. What is the largest rate of interest at which it is worth his taking out a loan to get the discount.
4. An investor has a promissory note for \$10,000 in 240 days at 8% simple interest. After 230 days, she sells it to a bank which discounts notes at 7.8% interest.
 - (a) How much does the bank pay for the note?
 - (b) What rate of return does the investor achieve?
 - (c) If the debtor pays the debt on the due date (i.e., not after 3 days grace), what rate of return does the bank achieve?
5. Mr. Smith takes out a loan of \$10,000 at 5% simple interest on 11th May 2011. He pays it back with a repayment x on 12th July 2011, and a repayment of \$4,000 on 3rd September 2011. The loan is calculated using exact interest.
 - (a) Write down and solve an equation of value for x with focal date:
 - (i) 11th May.
 - (ii) 12th July.
 - (iii) 3rd September.
 - (b) Which (if any) of these gives the correct value for x ?

6. A man takes out a one-year loan for \$10,000 at 7% simple interest. After 4 months, he repays \$2,500. After 7 months from the start of the loan, he repays a further \$4,000.
- (a) Calculate the outstanding balance at the end of the year, using:
- (i) The Declining Balance Method.
- (ii) The Merchant's Rule.
- (b) Suppose that the rule for partial payments is the Declining Balance Method. If the borrower can invest his money in a bank account, and receive an interest rate of r simple interest, what is the smallest value of r , such that it is better to do this than to make the repayments above?
7. What rate of simple discount is equivalent to 11% simple interest over a period of 9 months?