MATH 2600/STAT 2600, Theory of Interest
FALL 2010
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Homework Sheet 2
Due: Thursday 7th October: 1:00 PM

1. Calculate the accumulated value on maturity of $1,000 invested for 23 years at 5% interest compounded:

   (a) annually.

   (b) monthly.

2. Which of the following rates of interest is best for the investor:

   (i) 10% compounded monthly

   (ii) 10.5% compounded annually

   (iii) 9.8% compounded daily

3. A man wants to buy a car which costs $20,000 today (including all taxes) and whose price is linked to inflation of 6%. He currently has $17,000, which he plans to invest until he has enough to buy the car. How long does he have to wait before he can afford to buy the car: [Use the theoretical method for fractional interest periods.]

   (a) if he can invest his money at 8% compounded annually?

   (b) if he can invest his money at 10% compounded annually?

4. An investor has a promissory note for $10,000 in 8 years at 4% interest compounded monthly. After 3 years, 7 months, she sells it to a bank which discounts notes at 3% interest.

   (a) How much does the bank pay for the note?

   (b) What annual effective rate of return does the investor achieve?

   (c) If the investor is looking to make a return of 5.5% on her investment, by what time does she need to sell it to the bank? [Use the exact method for fractional months.]

5. Mr. Smith invests $10,000 at 5% interest, compounded annually. He plans to use the investment to pay a bill of $4,000 after 7 years. What is the largest amount x that he can take out after 2 years 8 months, and still have enough to pay the $4,000 after 7 years?

   (a) Calculate x assuming the investment uses:

   (i) the exact method for partial time intervals.

   (ii) the approximate method.

   (b) For the approximate method, does it matter which date is chosen as the focal date for the equation of value? If so, what is the correct choice?

6. A man takes out a 10 year loan for $20,000 at 7% interest, compounded annually. After 4 years, the interest rate increases to 9%. He repays $12,000 after 5 years, then after 7 years from the start of the loan, he repays a further $4,000. Calculate the outstanding balance at the end of the 10 years.

7. A woman invests $30,000 at 5% interest compounded annually. She wants to use this money to give $20,000 to each of her children when they turn 18. She currently has 2 children aged 9 and 4, and she plans to have a third child. How long does she have to wait before having the third child, in order for the investment to be sufficient?