Department of Mathematics

MA162 Chapter 5 Exam (Makeup)

July 22, 2010

DO NOT TURN THIS PAGE UNTIL INSTRUCTED TO DO SO.

Instructions: Be sure that your name, section number, and student ID are filled in below. Cell phones must be OFF and put away before you open this exam. You may use calculators (including graphing calculators, but no laptops or cellphone calculators) for checking numerical calculations, but you must show your work to receive credit. Put your answers in the answer boxes provided, and show your work. If your answer is not in the box or if you have no work to support your answer, you will receive no credit. The test has been carefully checked and its notation is consistent with the homework problems. No additional details will be provided during the exam.

Problem	**Maximum**	**Actual**
1	20	
2	20	
3	20	
4	20	
5	20	
Total	100	

Name: _____
Section: 020
Last four digits of Student ID: _____

Useful formulas

1. Simple Interest: $I = Prt$. Accumulation: $A = P(1 + rt)$.
2. Compound Interest Accumulation: $A = P(1 + i)^n$. Present value: $P = A(1 + i)^{(-n)}$.
3. Effective rate: $r_{eff} = (1 + \frac{r}{m})^m - 1$.
4. Annuity: Sum: $S = R\frac{((1+i)^n-1)}{i}$. Present value: $P = R\frac{(1-(1+i)^{-n})}{i}$.

1. Rusty, the owner of Rusty's Rundown Residences, knows that he will need $80,000 after about 8 years from now to buy new water boilers for his community. He notices that the business's savings could not cover such a purchase, even with a special assessment. Rusty decides to invest in a growth fund to have enough money available after 8 years.

(a) How much would he have to invest now at 6% annual rate compounded annually to have that sum available?

(b) Suppose he finds a better investment opportunity which offers bi-weekly compounding at the same annual rate. Assuming 26 nominal bi-weeks in the year, how much would he need to invest in the new scheme? Be sure to show the formulas used.

2. In this problem, assume a 360 day year. "Check Yourself!" will loan you 80% your paycheck of $370 for 14 days. After 14 days, you pay back the loan plus an interest of $55. *Rates verified online July 2010.*

(a) Calculate the annual simple interest rate for this service.

(b) Across the street, "Mo Money, Mo Money, Mo Money!" will loan you 5% more of your paycheck but charge you an interest of $60. Is this a lower rate?

3. You are about to finance the purchase of a new house with a 20 year loan of 100 thousand dollars at 4.8% APR compounded monthly.

(a) You are supposed to pay monthly. What is your monthly payment and what is the total of your payments over the period of 20 years?

(b) Suppose that another lender had offered the same loan with the same interest rate but for 30 years instead of 20 years. What will be the new monthly payment and the total of the payments over the period of 30 years?

4. John got a new job and wants to buy himself a condo, but currently has no savings. Rather than take on a high interest loan, he decides to save up a $15,000 down payment. He wants to put a fixed amount of money into a money market account every month, so that he can get used to the mortgage payment as well. The money market account is expected to earn about 1.67935% according to his day trading friend and adviser Gesse, and he'd like to have the down payment in two years.

(a) How much should John save each month?

(b) At the end of 2 years, John decides to wait another year since he might be moving. If he decides to keep making the payments for that extra year, how much additional money will accumulate in the account?

5. You've got \$78 and have found two banks that offer 7% interest. Lenny's Loans and Loot Conversion offers 7% simple interest, and Barry's Bank and Bingo Quarters offers 7% interest, compounded daily (assuming a 360 day nominal year).

(a) How long would it take your investment to grow to \$100 at Lenny's LLC?

(b) How long would it take your investment to grow to \$100 at Barry's BBQ?