

STUDENT'S NAME: \_\_\_\_\_ ID #: \_\_\_\_\_

DEPARTMENT OF MATHEMATICS AND STATISTICS

UNIVERSITY OF NEW BRUNSWICK

MATH 1833 TEST 2 (NOVEMBER 15, 2006)

TIME: 2 HOURS

**CALCULATORS ALLOWED, BUT SHOW ALL YOUR WORK**

$$A = P + rt \quad A = P(1 + i)^n \quad r_{eff} = (1 + r/m)^m - 1$$

$$S = R \cdot \left[ \frac{(1 + i)^n - 1}{i} \right] \quad P = R \cdot \left[ \frac{1 - (1 + i)^{-n}}{i} \right]$$

- (3 marks) Thirty years ago someone opened a savings account and deposited \$3000 into it. The account yields interest at an annual rate of 7%, compounded monthly. How much is there in the account now?
- (3 marks) George is considering two savings accounts. Savings account at Bank A has an annual interest rate of 12%, compounded quarterly. Savings account at Bank B has an annual interest rate of 11.9%, compounded daily. Which of the two banks should George choose?
- You have an account earning interest at an annual rate of 7%, compounded monthly.
  - (2 marks) How much should you deposit into the account now, if you want to accumulate \$100000 in ten years?
  - (2 marks) How long will it take to double any amount you deposit into this account?
- (3 marks) Julia is buying a car. She has \$1000 for down payment and she will pay off the rest by making equal monthly payments over five years. The dealer offers financing at an annual rate of 8%, compounded monthly, and Julia can afford a monthly payment of \$200. What is the highest sticker price of a car that Julia can afford?
- Jimmy bought a car that cost \$10000. He made no down payment and financed the purchase through his bank at an annual rate of 6%, compounded monthly. He agreed to amortize the loan over five years in equal payments at the end of each month.
  - (2 marks) What is Jimmy's monthly payment?
  - (2 marks) How much does he owe the bank three years after the purchase? (I.e., after he made 36 payments.)
- For 20 years since the age of 25, Cynthia has been making monthly payments of \$300 at the end of each month into her retirement savings account which earns interest at an annual rate of 4%, compounded monthly.
  - (2 marks) How much money will Cynthia have in this account at the age of 45?
  - (2 marks) Cynthia stops making payments at the age of 45. How much money will accumulate in her savings account by the time she is 60?

7. (3 marks) Barb's parents want set up a college fund for her. They will make deposits at the end of each month for a full 12 years into an account earning interest at an annual rate of 6%, compounded monthly. If they want Barb to have \$30000 in this account at the end of the 12 years, how much should they deposit every month?
8. Frank bought a computer for \$1500 in November 2005. In November 2006 the computer is worth \$900.
  - (a) (1 mark) Assuming linear depreciation, determine the value of Frank's computer in June 2007.
  - (b) (1 mark) Assuming linear depreciation, determine when will Frank's computer have the value of zero.
9. An up-and-coming band sells posters for 40 cents per copy. Their management has two offers from printers. The offer from Jones Printing entails fixed costs of \$1000 and 20 cents per printed copy. The offer from Smith Digital entails fixed costs of \$2400 and 10 cents per printed copy.
  - (a) (2 marks) Determine the break-even point for each of the two offers. Which offer should the management choose if they expect to sell 7000 posters?
  - (b) (2 marks) If the projected sales of the posters are 10000, which printer's offer should the management choose?