

## MATH 1090 - SUMMER 2007 - ASSIGNMENT #7

### COMPOUND INTEREST

- (1) Find the compounded amount in each case:
  - (a) \$1000 were invested at APR = 4% compounded semi-annually, for 8 years.
  - (b) \$1000 were invested at APR = 4% compounded quarterly, for 8 years.
- (2)
  - (a) Suppose \$5000 amounted to \$6400 after 5 years. Find the interest rate compounded annually.
  - (b) Suppose \$5000 amounted to \$6400 after 5 years. Find the APR compounded monthly.
- (3)
  - (a) How long will it take \$900 to amount to \$1000 at an APR of 4% compounded annually?
  - (b) How long will it take \$900 to amount to \$1000 at an APR of 4% compounded monthly?
  - (c) How long will it take \$600 to amount to \$1000 at an APR of 12% compounded annually?
- (4) In each case find the effective rate  $r_e$  rounded to three decimal places which corresponds to the nominal rate given:
  - (a) 5% compounded semiannually.
  - (b) 3% compounded monthly.
  - (c) 12% compounded quarterly.
- (5) A savings account earns 5% interest compounded quarterly.
  - (a) Find the effective rate.
  - (b) Suppose \$5000 were invested for 1 year. Compute the compounded amount using the data of the nominal interest rate and 4 time periods.
  - (c) Compute the compounded amount using the effective interest rate and 1 time period. Compare to your answer in 5b.

- (6) Suppose an investor wants to invest \$5000 and is considering two options: option  $A$  earns an APR of 10% compounded monthly, option  $B$  earns an APR of 10.5% compounded quarterly.
- (a) Find the effective interest rate in each case.
  - (b) Find the compounded amount at the end of the first year, in each case.
- (7) Find the present value (principal) of the given future payment:
- (a) \$1000 due in two years at a nominal rate of 5% compounded semi-annually.
  - (b) \$8000 due in  $7\frac{1}{2}$  years at a nominal rate of 6% compounded quarterly.
- (8) A trust fund is being set up for a 10-year old child so that at the age of 21, the child will receive \$27,000. Find the principal (present value) that needs to be invested if the interest rate is 6% compounded semiannually.
- (9) *Answer this question on a different page than the rest, you will need the room:* A debt of \$550 due in 4 years is to be payed in 2 installments. The first of \$200 to be paid now, and the rest to be paid in 2 years. The APR is 6% compounded quarterly.
- (a) Draw a time line for this problem. Call the first payment  $A$  the second payment  $B$  and their sum  $C$ . Write down the data in the proper place on the time line, and in the proper row for  $A$ ,  $B$  and  $C$ .
  - (b) Find the value of  $A$  and  $C$  after 4 years. Deduce the value of  $B$  in 4 years.
  - (c) Find the value of  $B$  in 2 years. Add the new information to your diagram.