SET 2: Applied Mathematics

Tutorial 7

1. An investment of $300,000 is made at an annual interest rate of 5.5%. If interest is compounded for a period of 10 years. Calculate the total interest earned and the accrued amount after the ten year period.

[***Ans.*** $212,443.34, $512,443.34]

2. Ahmed invested OMR1900 for 10 months in an account and he earned a simple interest of OMR 120. What is the monthly interest rate at which the simple interest was earned? [***Ans.*** 0.632%]

3. Muscat Bakery plans to save $12000 to buy new ovens in 6 years. How much do they need to invest today at 5.5% compounded semi-annually to meet their need? [***Ans.*** $6311.78]:

4. In each of the following calculate the accrued amount after investment for the given number of years where the interest is to be compounded continuously.

(a) £500 invested at an annual rate of 4% for 20 years

(b) £3,000 invested at an annual rate of 3.2% for 5 years

(c) £25,000 invested at an annual rate of 6.5% for 3 years

[***Ans.*** (a) £1112.77, (b) £3520.53, (c) £30382.77]

5. Calculate the difference between your result of problem 4 and the amount that would be earned by compounding annually. [***Ans.*** (a) £17.21, (b) £8.82, (c) £184.03]

6. Nasser took a loan of $10,000 at an annual rate of 7%. If he paid a simple interest of $1,400, how many years did it take him to pay back the loan? [***Ans.*** 2 years]

7. Fatma took today a loan of OMR 5000 at a rate of 7.5% compounded annually. She needs to borrow another OMR 3000 after 2 years from now at an expected rate of 8% compounded annually. If she plans to pay back the two loans together after 5 years from now, how much should she pay back? [***Ans.*** OMR 10,957.3]

8. An amount of $4500 was invested at interest rate i, compounded continuously, and grew to $6074.36 in 4 years.

(a) What is the interest rate?

(b) Find the exponential growth (continuous compounding) function $S(t)$.

(c) What will the balance be after 8 years?

(d) After how long will the $4500 double?

[***Ans.*** (a) 7.5%, (b) $S(t) = 4500e^{0.075t}$, (c) $8199.5, (d) 9.24 years]