1. Jim deposits $5000 in a savings account. During the first three years, the annual effective rate of compound interest is paid at 5%, for the next two years it is 4%, and for the following four years it is 3.5%. If Jim closes his account after eight years, what will his balance be?

2. John deposits $100 in a three-year certificate of deposit for which interest is compounded quarterly and left to accrue. At the end of three years, the balance in the CD is $175.63. What is the nominal annual interest rate converted quarterly?

3. What is the present value of $2000 due in ten years assuming money grows according to compound interest and the annual effective rate of interest is 4% for the first three years, 5% for the next two years, and 3% for the final five years?

4. Joe receives an allowance of $20 at the end of each month. His four year old sister Jan receives an allowance of $1 at month’s end. Find the value on January 1 of each of their allowances for the twelve month period from January to December, using a monthly interest rate of 2%.

5. During 2009, Jane had a dividend payment of $150 directly deposited into a savings account on the first of each month. Find the accumulated value of these payments at the end of the year if his account had a nominal interest rate of 6% payable monthly.

6. Dr. Jones began making contributions to a new retirement account on her thirtieth birthday. She made contributions of $2000 at the beginning of each year through her sixty-fourth birthday. Starting at age 65 and continuing through her 80th birthday, she made a level withdrawal on her birthday. Find the amount of these withdrawals if they completely exhaust the balance in her account and the annual effective interest rate is 6% until she is 65, then 5% thereafter.

7. Susan receives an annuity for her 18th birthday. The annuity pays $1000 on her nineteenth birthday and then has an annual payment on each of her birthdays through her 35th birthday. Each year the payments increase by $500. Find the value of the annuity on Susan’s 18th birthday, assuming the annual effective rate of interest is 6%.

8. Kendra receives $900 now, $970 in one year, $1040 in 2 years, $1110 in 3 years, and so on, until the final payment of $1600. Using an annual effective interest rate of 10%, find the present value of these payments at time $t = 0$. 