Practice Problems – Unit 9 Compound Interest

Q1. To what amount will $2000 grow after 15 years if it earns:

a. 3% compounded annually
b. 3% compounded semi-annually
c. 3% compounded quarterly
d. 3% compounded monthly
e. 3% compounded daily (assume 365 days in a year)

Q2. What is the maturity value of a $5000 loan for 15 months at 5.2% compounded quarterly? How much interest is charged on the loan?

Q3. How much more will an investment of $10,000 earning 5% compounded annually be worth after 10 years than after 5 years? Calculate the difference in dollars.

Q4. Payments of $1300 due today and $600 due in 1.5 years are to be replaced by a single payment 4 years from now. What is the amount of that payment if money is worth 2% compounded quarterly?

Q5. Justine borrowed $3000, $3500, and $4000 from Shelly on January 1 of three successive years at MacEwan University. Justine and Shelly agreed that interest would accumulate on each amount at the rate of 5% compounded semi-annually. Justine is to start repaying the loan one year after the $4000 loan. What is the consolidated amount she will owe at that time?

Q6. Ann has just deposited $5000 in each of three savings plans containing index ETFs (exchange traded funds) for her grandchildren. They will have access to the accumulated funds on their 19^{th} birthdays. Their current ages are 16 years 4 months (Wanda), 5 year and 2 months (Murli), and 1 year and 7 months (Noufou). If the plans earn 7% compounded quarterly (long run average rate of return for a stock index ETF), what amount will each grandchild receive at age 19?

Q7. What amount invested today would grow to $10,000 after 20 years, if the investment earns:

a. 3% compounded annually
b. 3% compounded semi-annually
c. 3% compounded quarterly
d. 3% compounded monthly
e. 3% compounded daily (assume 365 days in a year)

Q8. The maturity value of an investment after 42 months is $19,345. What was the amount of the original investment if it earned 6% compounded semi-annually?

Q9. What amount 13 months ago is equivalent to $2750 2.5 years from now if interest is 3.7% compounded monthly?

Q10. What single amount, paid 3 years from now, would be equivalent to $1400 today and $2200 in 5 years if invested funds earn 3.5% compounded quarterly?

Q11. What single payment 5 months from now would be equivalent to payments of $500 due, but not paid, four months ago and $900 due in 14 months? Assume interest is 5.5% compounded monthly.

Q12. TSN has just reported that star football player Jaxson de Ville has just signed a "five year $72 million deal" with the Kansas City Chiefs. The structure of the deal is as follows: signing bonus of $8 million, $10 million in each of the first two years, $12 million in each of the next 2 years, and the remainder in the final year of the contract. Assume that annual payments are made at the end of the year and that the interest rate is 5% compounded semi-annually. What is the present value of Jaxson's contract?

Q13. Big Red Finance Corp buys conditional sale contracts from furniture retailers at discounts that provide a 14.5% compounded quarterly rate of return on the purchase price. What total price should Big Red Finance pay for the following three contracts: $750 due in three months, $1250 due in 9 months and $1000 due in 7 months?

Q14. A $10,000 loan at 7% compounded semi-annually is to be repaid by three equal payments due in 5 months, 22 months and 29 months after the date of the loan. What is the size of each payment?

Q15. The scheduled payment stream consists of $5000 due today and $10,000 due in five years. The lender and creditor have agreed to change the payment structure. The new payment structure is to consist of three equal payments due in one, three and five years. Determine the size of each payment if the interest rate is 5% compounded monthly.

Q16. Two payments of $2000 each are scheduled for six months from now and two years from now. The creditor has proposed to reschedule the payments as follows: a payment one year from now and a second payment, half the size of the first payment, three years from now. What is the amount of each payment for the proposed payment plan to be equivalent to the original one? Assume that money can earn 4.8% compounded quarterly.

Q17. Payments of $1000 due in three years and $3000 due in five years from today are replaced by two payments due 1.5 years and 4 years from today. The first payment is twice the amount of the second payment. How much should the payment be if money can earn 4.25% compounded annually?

Q18. Payments of $4000 due 6 months ago and $5000 due in six months are to be replaced by a payment of $3000 today, a second payment in nine months, and a third payment, three times as large as the second, in 1.5 years. What should the last two payments be if money earns 2.5% compounded monthly?