Unit 10 – Annuities - Extra Practice Questions

Q1. John plans on contributing $6,000 every year (the maximum allowable in 2020) to his TFSA. What is the future value after 25 years if the fund earns 5.5% compounded annually?

Q2. Ludwig contributed $3000 to his RRSP every six months. What was the value of his RRSP after 13.5 years if the RRSP grew at 4.5% compounded semi-annually?

Q3. Nick intends to save for occasional major travel holidays by contributing $375 at the end of each month to an investment plan. At the end of every three years, he will withdraw $10,000 for a major trip abroad. If the plan earns 6% compounded monthly, what will be the plan's balance after seven years?

Q4. Milton contributed $10000 to a TFSA at the end of 2015. In 2016, the maximum allowable annual contribution was reduced to $5500. Milton contributed $5500 at year end to a TFSA until 2019 when the annual contribution limit was raised to $6000. He made the maximum allowable annual contribution at the end of every year for the next 15 years (i.e from 2020 to 2034). At the end of his contributions how much will Milton have in his TFSA if his average rate of return is 8% compounded annually?

Q5. Determine the present value of end of month payments of $75 continuing for 5.5 years. Assume the interest rate is 8% compounded quarterly.

Q6. A new loan at 9% compounded quarterly requires quarterly payments of $740.53 for 11 years. What amount was borrowed?

Q7. Dinesh's monthly payments of $199.92 will pay off her mortgage loan in 15 years and 3 months. The interest rate on her mortgage is 3.6% compounded monthly. What is the current balance of the loan?

Q8. Ron and Pat wish to structure the payments from a 20 year annuity so that the end of quarter payments increase by $500 every FIVE years. Hitchens and Sowell Insurance will pay 5% compounded quarterly on funds received to purchase such an annuity. How much must Ron and Pat pay for an annuity in which the quarterly payments increase from $2000 to $2500 to $3000 to $3500 in successive five year periods? (Challenging problem 😊)

Q9. A member of the MacEwan University Faculty pension plan is considering retiring at age 60 or 65. He has been offered two lifetime pension options: retire at age 60 collect $1462 per month until death; retire at age 65 collect $2316 per month until death. Assume that the instructor is expected to live until age 85. Compare the economic value of the two pension options assuming that money is worth 6.5% compounded monthly. (Another challenging one 😊)

Q10. What is the future value eight years from now of each of the following cash flows streams if money can earn 4% compounded semi-annually?

a. Single payment of $5000 today
b. An ordinary annuity starting today with eight annual payments of $900
c. An ordinary annuity starting in three years with 20 quarterly payments of $400

Q11. Rebecca is trying to decide if she should make regular month end $100 deposits to her TFSA or deposit $300 at the end of very three months instead. How much larger is the option with the higher future value after 20 years if both investments earn 4.25% compounded annually?

Q12. Don expects to contribute $400 to his TFSA at the end of every month for the next 5 years. For the subsequent 10 years, he plans to contribute $1500 at the end of each calendar quarter. How much will be in his TFSA at the end of 15 years if the funds earn 7% compounded semi-annually?

Q13. A 20 year annuity is purchased for $300,000. What payment will it deliver at the end of each quarter, if the funds earn:

a. 4% compounded quarterly?
b. 5% compounded quarterly?
c. 6% compounded quarterly?
d. 7% compounded quarterly?

Q14. Kim wants to save $16,000 so he can take a trip to New Zealand when he graduates from university 3.5 years from now. How much must she contribute to a savings plan at the end of every month if the plan earns 3.2% compounded monthly?

Q15. In order to purchase a truck McLean Transport recently obtained a $55,000 loan for the five years at 5.8% compounded semi-annually.

a. What are the monthly payments on the loan?
b. What will be the loan's balance a the end of the third year?
c. How much interest will McLean pay in the first three years?

Q16. As of Allan's 56th birthday, he has accumulated $195,000 in his RRSP. He has ceased contributions but will allow the RRSP to grow at an expected 7% compounded monthly until he reaches 65. Then he will use the funds in the RRSP to purchase a 20 year annuity. What will be his end of month annuity payments be if the money used to purchase the annuity earns 3.2% compounded semi-annually?

Q17. Five years from now Jonah and Doug plan to take a year's absence from their jobs to visit small towns in Saskatchewan. They want to accumulate enough savings during the next five years so they can withdraw $3000 at the end of each month for the entire year of leave. What amount must they pay into the fund at the of every quarter for the next five years to reach

their goal? The forecast that their savings will earn 6.5% compounded monthly for the next five years and 4.2% compounded monthly during the sixth year (the travel year).

Q18. How long will it take an RRSP to grow to $500,000 if takes in month end contributions of $1000 and it earns:

a. 4% compounded monthly
b. 6% compounded monthly
c. 8% compounded monthly
d. 9% compounded monthly

Q19. How long will $398,908, in a brokerage account that earns 8% compounded quarterly, sustain month end withdrawals of $3000?

Q20. How much longer will it take to pay off a $100,000 loan with monthly payments of $1000 than with monthly payments of $1100? The interest rate on the loan is 8.5% compounded annually.

Q21. If $100,000 will purchase a 20 year annuity that is expected to pay $830 at the end of every month, what quarterly compounded nominal rate and effective rate of invested will the invested funds earn?

Q22. For $150,000, Alberta Life Insurance Co. will sell a 25 year annuity paying $1500 at the end of each month. What effective rate of return does the annuity earn?

Q23. The interest rate on a $30,000 loan is 7.4% compounded monthly.

a. What monthly payments are required to pay off the loan in seven years?
b. What monthly payments would be required to reduce the balance to $10,000 after four years?

Q24. How much sooner will a $65,000 loan at 7.8% compounded quarterly be paid off if the monthly payments are $625 instead of $600? What will be the approximated saving in interest costs over the life of the loan?

Q25. Two thousand dollars will be contributed to a TFSA at the end of every six months for 20 years. What effective rate of return must the funds in the plan earn if it is to be worth $250,000 at the end of the 20 years?

Q26. A 70 year old man can purchase either of the following two annuities for the same price from a life insurance company. A 20 year term annuity will pay $394 at the end of each month. A life annuity will pay $440 at the end of each month until death. To what age must the man survive for the life annuity to have the greater economic value? Assume that money can earn 7.2% compounded semi-annually.