**TCH 302 – PRINCIPLES OF FINANCE**

**TUTORIAL 2**

1. **If you invest $1,000 today at an interest rate of 10%/year, how much will you have 20 years pơfrom now assuming no withdrawals in the interim? Hi**
2. If you invest $100 every year for the next 20 years starting one year from now and you earn interest of 10% per year, how much will you have at the end of the 20 years? How much must you invest each year if you want to have $50000 at the end of the 20 years
3. If you borrow $10,0000 from a bank for 30 years at an APR of 13%, monthly payment, what will EFF be? EFF là gì v ;-;
4. **What is the present value of the following cash flows at the interest rate of 10%/year?**
5. **$100 received 5 years from now.**
6. $100 received 60 years from now.
7. **$100 received each year beginning one year from now and ending 10 years from now.**
8. $100 received each year for 10 years beginning now.
9. $100 each year beginning one year from now and continuing forever.
10. You want to establish a “wasting” fund, which will provide you with $1,000 per year for four year, at which time the fund will be exhausted. How much must you put in the fund now if you can earn 10% interest per year?
11. You are taking out a $100,000 mortgage loan to be repaid over 25 years in 300 monthly payments.
12. If the interest rate is 16% per year, what is the amount of the monthly payment?
13. If you can only afford to pay $1,000 per month, how large a loantake?
14. If you can afford to pay $1,500 per month and need to borrow $100,000, how many months would it take to pay off the mortgage?
15. If you can pay $1,500 per month, need to borrow $100,000 and want a 25-year mortgage, what is the highest interest rate you can pay?
16. In 1626, Peter Minuit purchased Manhattan Island from the Native Americans for about $24 worth of trinkets. If the tribe had taken cash instead and invested to earn 8% per year compounded annually, how much would the Indians have had in 2016, 390 years later?
17. You win a $1million lottery, which pays you $50,000 per year for 20 years. How much is your prize really worth, /an interest rate of 8%?
18. Your great-aunt left you $20,000 when she died. You can invest the money to earn 12% per year. If you spend $3,540 per year out of this inheritance, how long will the money last?
19. Calculate the net present value of the following cash flows: you invest $2000 today and receive $200 one year from now, $980 two years from now and $ 1200 for 2 years starting three years from now. Assume that the interest rate is 14% per year.
20. **How much is the value of your 12% bank account on 1/1/2016 if you put $100 into it on 1/1/2012, $200 on 1/1/2013, $300 on 1/1/2014?**
21. If you put $1000 into your 14% bank account on 1/1/2012, $2000 on 1/1/2013, and $3000 on 1/1/2014, when will you get $12668.46?
22. You must pay a creditor $8000 one year from now, $5000 two years from now, $4000 three years from now, $2000 four years from now. You would like to restructure the loan into four equal annual payments due ***at the end of each year***. If the agreed interest rate is 12% compounded annually, what is the payment?
23. You borrow $100,000 from a bank for 30 years at an APR of 10.5%. What is the monthly payment? If you must pay two points up front, meaning that you only get $98,000 from the bank, what is the true APR on the mortgage loan?

Suppose that the mortgage loan described in question 14 is a one-year adjustable rate mortgage (ARM), which means that the 10.5% interest applies for only the first year. If the interest rate goes up to 12% in the second year, what will your new **monthly payment** be?

1. An investor is looking at a $150,000 house. If 20% must be paid down and the balance is financed at 12% over the next 30 years. What is the annually mortgage payment?
2. An investor is looking at a $150,000 house.,,./????
3. You have just received a gift of $500 from your grandmother and you are thinking about saving this money for graduation which is 4 years away. You have your choice between Bank A which is paying 7% for one – year deposits (compound interest annually) and Bank B which is paying 6% per year (compound every three months). What is the future value of your savings one year from today, 4 years from today if you save your money in Bank A? Bank B? Which is the better decision?
4. Lai’s great aunt left him $20,000 when she died. He can invest the money to earn 12% per year. If he spends $3,540 per year out of this inheritance, how long will the money last?
5. Mai has three personal loans outstanding to her friend. A payment of $1000 is due today, a $500 payment is due one year from now and a $250 payment is due two years from now. She would like to consolidate the three loans into one, with thirty – six equal monthly payments, beginning one month from today. Assume the agreed interest rate is 8% (effective annual rate) per year. How large will the new monthly payment be?
6. Larry’s bank account has a “floating” interest rate on certain deposits. Every year the interest rate is adjusted. Larry deposited $20,000 three years ago, when interest rates were 7% (annual compounding). Last year, the rate was only 6%, and this year the rate fell again to 5%. How much will be in his account at the end of this year?
7. **A local bank advertises the following deal: “Pay us $100 a year for 10 years and then we will pay you (or your beneficiaries) $100 a year forever”. Is this a good deal if the interest rate available on other deposit is 6%?**
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9. P&G company should invest in which projects among following projects:

Unit: Million VND

|  | Year 1 | | Year 2 | | Year 3 | |
| --- | --- | --- | --- | --- | --- | --- |
| Revenue | Cost | Revenue | Cost | Revenue | Cost |
| Project 1 | 800 | 500 | 1000 | 500 | 1200 | 600 |
| Project 2 | 300 | 100 | 300 | 150 | 500 | 200 |
| Project 3 | 1200 | 600 | 1200 | 600 | 1200 | 600 |
| Project 4 | 500 | 200 | 600 | 250 | 800 | 350 |

IR is 10% per year.

1. When you purchased a house, you took out a $500,000, 30-year monthly-payment mortgage with an interest rate of 12% per year. You have now decided to pay the mortgage off by repaying the outstanding balance. Calculate the annual payment.

**What** is the payoff amount if:

1. **You** decided to pay off the mortgage immediately after the 20th is made. /\*
2. You decided to pay off the mortgage immediately before the 20th payment is due.
3. Compute the interest paid at 30th payment
4. Your parents have deposited $500 into a savings account on since you were born. Every following year on your birthday your parents have been putting an additional amount which is 10% higher than the last deposit. Interest rate on the account is 5%, compounded annually. How much money will be in the account on your 20th birthday immediately before your parents make the deposit on that day?
5. A client has $202971.39 in an account that earns 8% per year, compounded monthly. The client’s 24th birthday was yesterday and she will retire when the account value is $1 million.
   1. At what age can she retire if she puts no more money in the account?
   2. At what age can she retire if she puts $250 per month into the account every month, beginning one month from today?
6. At retirement nine years from now, a client will have the option of receiving a lump sum of $400000 or 20 annual payments of $40000, with the first payment made at retirement. What is annual rate the client would need to earn on a retirement investment to be indifferent between the two choices?
7. You are buying a car and thinking of taking a one-year installment loan of $1,000 at an APR of 12% per year to be repaid in 12 equal monthly payments. Estimate the monthly payment.

The salesperson trying to sell you the car makes the following pitch: “Although the APR of this loan is 12%, in fact it really works out to be a much lower rate. Because the total interest payments over the year are only $66.19, and the loan is for $1,000, you will be only paying a “true” interest rate of 6.62%. What is the fallacy of this reasoning?

1. You are looking to buy a sports car costing $23,000. One dealer is offering a special reduced financing rate of 2.9% in the new car purchases for 3-year loans, with monthly payments. A second dealer is offering a cash rebate. Any customer taking the cash rebate would, of course, be ineligible for the special loan rate and would have to borrow the balance of the purchase price from the local bank at 9% annual rate. How large much the cash rebate on this $23,000 car to entice customer away from the dealer who is offering the special 2.9%?
2. Which grows to a larger future value, $1000 invested for 2 years at:
   1. 10 percent each year
   2. 5 percent the first year and 15 percent the second year or
   3. 15 percent the first year and 5 percent the second year?
3. The exchange rate between GBP and USD is currently $1.50 per pound, the dollar interest rate is 7%, the pound interest rate is 9%. You have $100,000 in a one-year account that allows you to choose between either currency. If you expect the GBP/USD exchange rate is $1.40 per pound a year from now on and are indifferent to risk, which currency you should choose?
4. Vincent Van Gogh sold only one painting during his lifetime, for about $30. A sunflower still life he painted in 1888 sold for $39.85 million in 1988, more than three times the highest price paid previously for any work of art. If this pain exting had been purchased for $30 in 1888 and sold in 1988 for $39.85 million, what would have been the annual rate of return?
5. You have been hired as a financial advisor to Michael Jordan. He has received two offers for playing professional basketball and wants to select the best offer, based on considerations of money only. Offer A is a $10m offer for $2m a year for 5 years. Offer B is a $11 moffer of $1m a year for four years and $7m in year 5. What is your advice? (Hint: compare the present value of each contract by assuming a range of interest rate, say 8% - 14%)
6. **What is the price of a 10 year zero coupon bond with redemption value 100 if the interest rate is assumed to be 6%p.a**
7. **What is the price of a 15 year fixed interest bond with coupons semiannually of 5% and redemption value $100 if interest rates (YTM) are assumed to be 5.5%p.a.?**

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1. If a share has an annual dividend with the next dividend being 6.5 in one years time and dividend growth is assumed to be 3% p.a. What is the fair price of the share assuming interest rates of 7%p.a. and assuming we hold the share indefinitely?
2. The rental income for a property is $500 p.c.m. (Per Calendar Month) with rent reviews every 3 years. Assuming that rents will increase by 3% at each rent review what is the present value of the income stream over the next 30 years assuming interest rates are 6.5% p.a.?
3. What is the price of a 20 year zero coupon bond with redemption value 100 if the interest rate is assumed to be 6.5% p.a.?