**Chapter 6 In Class Exercise Solution**

1. **Consider receiving the following cash flows:**

**Year 1 CF = $200**

**Year 2 CF = $400**

**Year 3 CF = $600**

**Year 4 CF = $800**

**If the discount rate is 12%, what would this cash flow be worth today?**

Cash flow of today =npv(rate, CF in year 1, CF in year 2, CF in year 3, CF in year 4)

=npv(12%, 200, 400, 600, 800) = 1433 > 1400, should stick to the cash flow plan.

1. **Your broker calls you and tells you that he has this great investment opportunity. If you invest $100 today, you will receive $40 in one year and $75 in two years. If you require a 15% return on investments of this risk, should you take the investment?**

CF1=40, CF2=75

Net present value =Npv(15%, 40, 75) = 91 <100

1. **Suppose you are looking at the following possible cash flows: Year 1 CF = $100; Years 2 and 3 CFs = $200; Years 4 and 5 CFs = $300. The required discount rate is 7%. What is the value of the cash flows at year 5? What is the value of the cash flows today? What is the value of the cash flows at year 3?**

Value of cash flow today = npv(7%, 100, 200, 200, 300, 300) = 874.17

Value of cash flow at year 5 = abs(fv(7%, 5, 0, 874.17)) = 1226.07

Cash flow at year 3 = abs(fv(7%, 3-1, 0, 100)) + abs(fv(7%, 3-2, 0, 200))+ 200 = 528.49

1. **After carefully going over your budget, you have determined you can afford to pay $632 per month towards a new sports car. You call up your local bank and find out that the going rate is 1 percent per month for 48 months. How much can you borrow?**

PMT= 632, nper = 48, rate =1%. PV=? FV=0

How much to borrow =abs(pv(1%, 48, 632, 0)) = 23,999.54

The car is $15,000 @1% monthly rate for 48 months. How much is your monthly payment?

=abs(pmt(1%, 48, 15000, 0)) = 395.01

The car is $15,000 and your monthly payment is $400 for 48 months. How much is monthly interest rate?

=rate(48, 400, -15000,0) = 1.06%

1. **Suppose you win the Publishers Clearinghouse $10 million sweepstakes. The money is paid in equal annual end-of-year installments of $333,333.33 over 30 years. If the appropriate discount rate is 5%, how much is the sweepstakes actually worth today?**

PMT=333,333.33, NPER=30, rate=5%, FV=0, cpt for PV=?

PV=abs(5%, 30, 333333.33, 0) =512,4150

1. **You are offered the opportunity to put some money away for retirement. You will receive five annual payments of $25,000 each, beginning in 40 years. How much would you be willing to invest today if you desire an interest rate of 12%?**
2. Can use NPV function directly.

=NPV(12%, 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0, 0,0,0,0,0, 25000, 25000, 25000, 25000,25000) = 1084.71

1. OR use PV function.

PV at year 39 = abs(pv(12%, 5, 25000, 0))= 90119.41

PV at year 0 = abs(pv(12%, 39, 0, 90119.41)) = 1084.71

1. **You want to receive 5,000 per month in retirement. If you can earn 0.75% per month and you expect to need the income for 25 years, how much do you need to have in your account at retirement?**

PMT=5000, rate=0.75%, nper=25\*12, fv=0, cpt for pv=?

PV = abs(pv(0.75%, 25\*12, 5000, 0)) =595,808.11

1. **Suppose you want to borrow $20,000 for a new car. You can borrow at 8% per year, compounded monthly (8/12 = .66667% per month). If you take a 4-year loan, what is your monthly payment?**

PV=20000, rate=8%/12, nper=4\*12, FV=0, cpt FOR PMT=?

Pmt=abs(pmt(8%/12, 48, 20000,0)) = 488.26

1. **You ran a little short on your spring break vacation, so you put $1,000 on your credit card. You can only afford to make the minimum payment of $20 per month. The interest rate on the credit card is 1.5 percent per month. How long will you need to pay off the $1,000?**

PV=1000, pmt=-20, rate=1.5%, fv=0, cpt for nper=?

Number of months = nper(1.5%, -20, 1000, 0) = 93.11 months

1. **Suppose you borrow $2,000 at 5%, and you are going to make annual payments of $734.42. How long before you pay off the loan?**

PV=2000, pmt=-734.42, rate=5%, fv=0, cpt for nper=?

Nper = nper(5%，-734.42， 2000， 0) = 3.00

1. **Suppose you borrow $25,000 from your parents to buy a car. You agree to pay $507.58 per month for 60 months. What is the monthly interest rate?**

PV=25000, pmt=-507.58, nper=60, fv=0, cpt for rate=?

 Monthly rate = rate(60, -507.58, 25000, 0) = 0.671%

1. **You want to receive $5,000 per month for the next 5 years. How much would you need to deposit today if you can earn 0.75% per month? What monthly rate would you need to earn if you only have $200,000 to deposit?**

Rate=0.75%, pmt=5000, nper=60, fv=0, cpt for pv=?

The amount to deposit = abs(pv(0.75%, 60, 5000, 0)) = 240866.87

pmt=5000, nper=60, PV=-200000, fv=0, cpt for rate=?

Rate = rate(60, 5000, -200000, 0) = 1.44%

1. **Suppose you begin saving for your retirement by depositing $2,000 per year in an IRA. If the interest rate is 7.5%, how much will you have in 40 years?**

Pmt=2000, rate=7.5%, nper=40, pv=0, cpt for fv=?

Fv = abs(fv(7.5%, 40, 2000, 0)) =454,513.04

1. **You are saving for a new house and you need 20% down to get a loan. You put $10,000 per year in an account paying 8%. The first payment is made today. How much will you have at the end of 3 years (you make a total of three $10,000 payments)?**

PMT=10000, rate=8%, nper=3, type=1 (this is annuity due), pv=0, cpt for fv=?

Fv = abs(fv(8%, 3, 10000, 0, 1)) = 35061.12

1. **Suppose you put it in another account and earn 3% per quarter. What is the APR? How much are you effectively earning?**

APR = quoted rate = 3% \*4=12%.

Effective rate = EAR = effect(12%, 4) = 12.55%

1. **You are looking at two savings accounts. One pays 5.25%, with daily compounding. The other pays 5.3% with semiannual compounding. Which account should you use? Which account should you choose and why?**

Compare the two accounts’ effective rates. The higher the better.

Daily compounding, effective rate = EAR = effect(5.25%, 365) = 5.39%

Semi compounding, effective rate = EAR = effect(5.3%, 2) = 5.37%

1. **Suppose you want to earn an effective rate of 12% and you are looking at an account that compounds on a monthly basis. What APR must they pay?**

Use nominal function.

APR =quoted rate = nominal(12%, 12) = 11.39%

EAR = (1+ APR/n)^n-1 🡺 APR = ((1+EAR)^(1/n)-1)\*n

1. **Suppose you want to buy a new computer system and the store is willing to allow you to make monthly payments. The entire computer system costs $3,500. The loan period is for 2 years, and the interest rate is 16.9% with monthly compounding. What is your monthly payment?**

PV=3500, nper=24, rate=16.9%/12, fv=0, cpt for pmt=?

Monthly payment = abs(pmt(16.9%/12, 24, 3500,0)) = 172.88

1. **Suppose you deposit $50 a month into an account that has an APR of 9%, based on monthly compounding. How much will you have in the account in 35 years?**

PMT=50, rate = 9%/12, nper=35\*12, pv=0, cpt for fv=?

Fv = abs(fv(9%/12, 35\*12, 50, 0)) =147,089.22

1. **You need $15,000 in 3 years for a new car. If you can deposit money into an account that pays an APR of 5.5% based on daily compounding, how much would you need to deposit?**

FV=15000, nper=3\*365, rate=5.5%/365, pmt=0, cpt for pv=?

 Deposit = abs(pv(5.5%/12, 3\*365, 0, 15000)) =12718.57

1. **What will the future value be if you open the account with $1,000 today @ 8% for 5 years, and then make the $100 deposits at the end of each year?**

Pv=1000, pmt=100, rate =8%, nper=5, cpt for fv=?

Fv = abs(fv(8%, 5, 100,1000)) = 2,055.99