Question for Financial Functions:

Effective rate of interest (conversion rate)

Q: Suppose a bank offers an interest of 8% per annum (yearly). Using MS Excel, compute the rate of interest for the following cases:

1. Rate of interest per month,
2. Rate of interest per quarter, and
3. Rate of interest per six month

Q. Create a MS Excel solution which accepts two inputs – 1) the rate of interest offered by a bank on a deposit per annum (yearly) and 2) the periodicity over which the interest is compounded. If the possible values for the periodicity are yearly, half monthly, quarterly and monthly, compute the modified rate of interest for the given periodicity.

Modifying number of conversion periods (2)

Q: Suppose a customer deposits some money with a bank for a duration of 7 years. Compute the following cases:

1. Number of periods if one period is equal to one year.
2. Number of periods if one period is equal to one half year.
3. Number of periods if one period is equal to one quarter.
4. Number of periods if one period is equal to one month.

Q. Create a MS Excel sheet which accepts two inputs – 1) the duration of a deposit in terms of years and 2) periodicity cycle as inputs. If the possible values for periodicity are yearly, half yearly, quarterly and monthly, compute the total number of periods for the entire duration.

FV (14)

Simple Interest

Q. Compute the simple interest on an investment of Rs 100000 for a period of 5 years at the conversion rate of 12% per annum. Find the solution through both the methods – 1) explicit computation and 2) using FV value.

Hint: FV with a onetime deposit. PV=-100000, NPER=5, RATE=12%, PMT=0, TYPE=does not matter;

$$FV = P(1 + r)^t$$

Compound Interest

Q. An amount of Rs. 5000/- is deposited with a bank for a period of 5 years at a rate of interest of 12% compounded annually. Compute how much money is expected to be obtained from the bank at the end of 5 years using the following methods – 1) through Excel function and 2) through explicit calculations.

Hint: FV with a onetime deposit. PV=-5000, NPER=5, RATE=12%, PMT=0, TYPE=does not matter;

$$FV = P(1 + r)^t$$

Q. Using the previous problem, compute the future value of the deposit for if the compounding of interest is done over each year, each six months, each quarter, each month and each day. Find out which method will generate the maximum future value. Assume that there are 365 number of days in an year.

Q. Solve the previous problem as if the payments were received by a bank. Compute how much money is to be paid by the bank at the end of 5 years.

Hint: Inflow to be considered as positive and outflows as negative.

Q. Solve the previous problem such that an initial deposit of Rs20000/- was also made in addition to annuity of Rs 5000/-

Q. Mr X wants to make an investment of Rs 50,000 for six years. He has two alternatives. The first alternatives fetches a return of 8% compounded annually and the second alternative fetches him a return of 7.5% compounded semi-annually. Which investment should he go for?

Hint: FV1=FV(8%,6,0,-50000) , FV2=FV(7.5%/2,12,0,-50000), FV1 is higher

Compound Interest at changing rates

Q. A man made a deposit of Rs. 2500 in a savings account. The deposit was left to accumulate at 6% compounded quarterly for the first 5 years and at 8% compounded semi-annually for next 8 years. Find the compound amount at the end of 13 years.

Q. Mr. X deposited Rs 10000/- in a bank for 3 years offering interest at the rate of 6% compounded half yearly during first year, and at the rate of 12% compounded quarterly during remaining years

Annuity

Q. An amount of Rs. 5000/- is deposited with a bank each year for a period of 5 years at a rate of interest of 12% per annum. Compute how much money is expected to be obtained from the back at the end of 5 years under the following cases:

1. Using Excel function assuming that the payments are considered to be paid at the end of each term
2. Using Excel function assuming that the payments are considered to be paid at the beginning of each term
3. Using the explicit calculations
4. Using explicit calculation for each separate deposit

Also solve the same from lender's view, i.e., compute how much money will the bank have to pay to the customer at the end of 5 years.

Hint: FV with a recurring deposit; Case 1: PV=0 PMT=-5000, NPER=5, RATE=12%, TYPE=0; Case 1: PV=0 PMT=-5000, NPER=5, RATE=12%, TYPE=1; $FV = P(1 + r)\frac{[(1+r)^t - 1]}{r}$

Note: The explicit calculations compute future value as if the payments were made at the beginning of each term.

Q. Compute the expected final returns for following patterns of deposits/investments.

Initial Amount	Rate of Interest	Compounding Cycle	Recurring deposit	Timing of recurring deposits for each term	Expected Return
0	12%	Semi-annually	10000	Beginning	
30000	7%	Monthly	0	NA	
500000	10%	Annually	5000	Ending	
500000	10%	Annually	5000	Beginning	

Q. At six-month intervals, A deposited ₹ 100 in a savings account with credit interest at 10% per annum compounded semi-annually. The first deposit was made when A's son was six months old and the last

deposit was made when his some was 8years old. The money remained in the account and was presented to the son on his 10th birthday. How much did he receive?

Hint: FV1=FV(10%/2,8*2,-100,0)= ₹ 2,365.75; FV2=FV(10%/2,2*2,0,- 2,365.75)= ₹ 2,875.58

Q. Mr. X deposits in his son's account ₹ 500 times his son's age at the end of each birthday. Find the balance accumulated at the tenth birthday, if the rate of interest is 10% annum compounded annually.

Hint: FV of sum deposited at ith birthday will be = FV(10%,10-I,0,500*i). Sum of all FVs will be ₹ 37,655.84

Q. Mr. X paid a loan in 8 quarterly instalments of Rs 500 each at the end of each quarter and a final payment of Rs 4000 at the end of ninth quarter. Find the initial loan taken if the rate of interest is 12% p.a. compounded quarterly and the total interest on the loan.

Hint: PV1=PV(12%/4,8,-5000,0)= ₹ 35,098.46; PV2 =PV(12%/4,9,0,-4000)=₹ 3,065.67; Total PV = ₹ 38,164.13

PV (7)

Q. How much down payment should a person deposit at the beginning of 5 year duration for accumulating Rs 100000 at the end. He also plans to deposit Rs 10000 per year as a recurrening deposit at the end of each year. The bank offers 8% rate of interest compounded annually.

Hint: =PV(8%,10,10000,-100000)

Q. Find the present value of Rs 500 due 10 years hence when interest of 10% is compounded helf yearly.

Hint: PV=PV(10%/2,20,0,500)

Q. What is the present value of a continuous income stream of Rs 5000 per year for three years if it is discounted continuously at the rate of 6% per year?

Hint: TBD

Q. Machine A costs Rs 10,000 and has a useful life of 8 years. Machine B costs 8000 and has a useful life of 6 years. Suppose machine A generates an annual labour savings of Rs 2000 while the machine B generates an annual labour savings of Rs 1800. Assuming the time value of mondy is 10% per annum, find which machine is preferable?

Hint: TBD

Q. A machine with useful life of 7 years costs Rs 10,000 while another machine with useful life of 5 years costs Rs 8000. The first machine saves labour expenses of Rs 1900 annually and the second one saves labour expenses by Rs 2200 annually. Assuming that the time value of money is 10% per annum, which machine is preferable.

Hint: TBD

Q. Mr X wants Rs 500000 at the end of 7 years. If the rate of interest is 8%, what amount shall be deposited at the beginning of each quarter so as to get the above amount?

Hint: TBD

Q. A house is sold for Rs 50000 down and 10 semi-annual payments of Rs 5000 each, the first due 3 years hence. Find the cash price of house if money is worth 20% compounded semi-annually.

Hint: TBD

Q. A loan of Rs 10000 is to be paid by equal instalments of principal and interest over a period of 20 years. The rate of interest is 3% per annum effective. Find the annual instalment.

Hint: TBD

Q. Mohan has first purchased a house for Rs 700000 and has made a down payment of Rs 150000. He proposes to repay the balance in 25 years by monthly instalments at 9% per annum compounded monthly. What are the monthly payments?

Hint: TBD

Q. Mr. X purchases a house for Rs 2,00,000. He agrees to pay fo the house in 5 equal instalments at the end of each year. If the money is worth 5% per annum effective, what would be the size of each instalment? In case X makes a down payment of Rs 50,000, what would be the size of each instalment?

Hint: TBD

Q. Calculate the present value of an annuity of Rs 30000 per annum, assumed to be payable continuously for 10 years, at the rate of interest of 8 per cent per annum compounded yearly.

Hint: TBD

Q. Mr X purchased an asset for Rs 100000 on instalment basis. Each instalment is to be paid at the beginning of each quarter. Find the size of each instalment if the money is to be repaid in three years and the rate of interest is 6% compounded quarterly.

Hint: TBD

Q. A macine costs a company Rs 52000 and its effective life is estimated to be 12 years. A sinking fund is created for replacing the machine by a new model at the end of each life time, when its scrap realizes a sum of Rs 5000 only. The price of new model is estimated to be 25% higher than the price of the present one. Find what amount should be set aside at the end of each year, out of the profit for the sinking fund, it is accumulates at 10% effective.

Hint: TBD

Q. A person wants to buy a computer after 5 years. Assuming that the per has to spend Rs 75000 on the computer at the time of purchase, how much money should a person deposit in the bank in order to

Q. An individual takes a loan from a lender on some terms and conditions. Compute the instalment expected to be paid by the individual using the following instructions.

1. Use the following sample format for the preparation of loan schedule statement.

Loan Details	
Amount of Loan	
Rate of Interest	
Duration of Loan	
Instalment	

1. Assume the 'amount of loan', yearly 'Rate of Interest' and 'Duration of Loan' in the form of years on your own.
2. Compute the instalment as a positive value.

Q. An individual takes a loan from a lender on some terms and conditions. Compute the instalment expected to be paid by the individual using the following instructions.

3. Use the following sample format for the preparation of loan schedule statement.

Loan Details	
Amount of Loan	
Rate of Interest	
Duration of Loan	
Repayment Periodicity	
Instalment	

1. Assume the 'amount of loan', yearly 'Rate of Interest' and 'Duration of Loan' in the form of years on your own.
2. Assume the 'Repayment Periodicity' on your own by selecting one value from four possible ways of repayments – Monthly, Quarterly, Half Yearly and yearly.
3. Compute the instalment as a positive value.

Hint: Temporary values can be created for effective number of terms and effective rate of interest for a single term, before computing the instalment amount.

Q. An individual takes a loan from a lender on some terms and conditions. Compute the instalment expected to be paid by the individual using the following instructions.

4. Use the following sample format for the preparation of loan schedule statement.

Loan Details	
Amount of Loan	
Rate of Interest	
Duration of Loan	
Repayment Periodicity	
Down Payment	
Instalment	

4. Assume the 'Amount of Loan', yearly 'Rate of Interest', 'Duration of Loan' in the form of years and 'Down Payment' on your own.
5. Assume the 'Repayment Periodicity' on your own by selecting one value from four possible ways of repayments – Monthly, Quarterly, Half Yearly and yearly.
6. Compute the instalment as a positive value.

Hint: 'Down Payment' refers to the payment made at the beginning of taking loan. Temporary values can be created for effective number of terms and effective rate of interest for a single term, before computing the instalment amount.

RATE(5)

Q. A National Savings Certificate costs Rs 15 and realises Rs 20 after 10 years. Find the rate of interest involved when it is added yearly.

Hint: RATE=RATE(10,0,-15,20)

Q. Find the effective rate equivalent to the nominal rate of 6% converted monthly.

Hint: FV = FV(6%/12,12,0,100), =RATE(1,0,100,-106.17)

Q. A moneylender charges interest at the rate of 10 paise per rupee per month, payable in advance. What effective rate of interest does he charge per annum?

Hint: Interest on 90 per month = 10; Rate of Interest = 10/90, FV of Rs 100 for an year at rate of interest of 10/90 per month = FV(11.11%,12,0,100), Yearly rate of interest =RATE(1,0,100,-354.07)

Q. Mr. X took a loan of Rs 2000 for 6 months. Lender deducts Rs 200 as interest while lending. Find the effective rate of interest charged by lender.

Hint: PV = (2000-200), NPER = ½ years FV=(1800+200) RATE=RATE(1/2,0,1800,-2000)

Q. A machine costing Rs 80000 would reduce to Rs 20,000 in 8 years. Find the rate of yearly depreciation, given that depreciation is calculated using diminishing balance method.

Hint: RATE

NPER(6)

Q. A man borrows Rs 750 from a moneylender and the bill is renewed after every half-year at an increase of 21%. After how much time the amount of bill will become Rs 7500?

Q. According to the will of a man, his Life Insurance of Rs 40,000 should be deposited in a bank soon after his death. The bank has to pay Rs 5000 annually to his heir and if the interest is 5% per annum compounded monthly, how many annual payments could be made?

Q. A person takes a loan of Rs 5000 from a money lender and promises to pay Rs 400 every six month. If the rate of interest is 18% compounded yearly, how many years will it take for the person to repay the entire loan?

Q. A person takes a loan of Rs 5000 from a money lender and promises to pay Rs 400 every six month. If the rate of interest is 18% compounded yearly, how many years will it take for the person to repay Rs 3000 of the loan?

Q. A person takes a loan of Rs 5000 from a money lender and promises to pay Rs 400 every six month. If the rate of interest is 18% compounded yearly and the payment of instalments starts from the first day, how many years will it take for the person to repay Rs 3000 of the loan?

Q. A person takes a loan of Rs 5000 from a money lender. The terms and conditions for the loan repayment are that 1) first 2000 has to be paid at an interest rate of 14% 2) while the remaining 2000 have to be repaid at an interest rate of 12% and 3) the last 1000 will be repaid at the time of closure. Find out how much time will it take to repay the loan completely.

IPMT(3)

Q. Assume that a deposit of Rs. 10000 is made with a bank that earns 8% annually for 5 years. Compute the interest earned for the 1st, 20th and 30th week while the interest payments are due at the beginning of each week.

Hint: The principal amount remains the same in the account. IPMT(8%/52, 20, 5*52, 10000, -10000,0)

Q. Assume that an investment of Rs. 10000 is made that earns 8% annually for 5 years in the form of equal instalment. Compute the interest earned for the 20th week while the payments are received at the beginning of each week.

Hint: The entire investment is repaid in the form of periodic payments. IPMT(8%/52, 20, 5*52, 10000, 0,1)

Q. A certain sum of money is invested at 4% compounded annually. The interest for the second year is Rs 250. Find the interest for the 3rd year.

Hint: IPMT

Q. A loan of Rs 10000 is to be paid by equal instalments of principal and interest over a period of 20 years. The rate of interest is 3% per annum effective. Find the capital contained in the 8th instalment.

Hint: TBD

Q. Mrs. S took a housing loan of Rs 8,00,000 to be paid in 10 years by equal monthly instalments. The interest charged is 10.5% compounded monthly. Find her monthly payment. After 2 years, the bank revised the interest rate to 12% compounded monthly. Find the new EMI, if the loan is to be cleared by the stipulated time.

Hint: TBD

Q. Mrs. S took a housing loan of Rs 8,00,000 to be paid in 10 years by equal monthly instalments. The interest charged is 10.5% compounded monthly. Find her monthly payment. After 2 years, the bank revised the interest rate to 12% compounded monthly. Find the new EMI, if the loan is to be cleared by the stipulated time.

Hint: TBD

Q. Compute the amount of principal paid off by the payment made in the 10th month of a loan of Rs 20,000 with monthly periodic payments at the rate of 9% per annum. The loan is to be paid off in 4 years with a remaining balance on the loan of Rs 3,000 after the 3 years.

Hint: PPMT(9%/12, 110, 4*12, 20000, 3000, 0)

Q. A loan of Rs 10000 is to be paid by equal instalments of principal and interest over a period of 20 years. The rate of interest is 3% per annum effective. Find the principal repaid after 12 instalments have been paid.

Hint: TBD

Q. Mr. M borrows Rs 10, 00, 000 from a bank to purchase a house and decided to repay by monthly instalments in 10 years. The bank charges interest at 9% compounded monthly. The bank calculated his EMI as Rs 12,668. Find the principal paid in the first and second year.

Hint: TBD

Q. Mr. M borrows Rs 10, 00, 000 from a bank to purchase a house and decided to repay by monthly instalments in 10 years. The bank charges interest at 9% compounded monthly. The bank calculated his EMI as Rs 12,668. Find the interest paid in the first and second year.

Hint: TBD

Q. Mohan has first purchased a house for Rs 700000 and has made a down payment of Rs 150000. He proposes to repay the balance in 25 years by monthly instalments at 9% per annum compounded monthly. What is the total interest payment?

Hint: TBD

Q. Assuming the cost of capital to be 12%, find out the net present value of the investment using formula, PV function and NPV function.

Period	0	1	2	3	4

Outflow	100000				
Inflow		25000	35000	36000	40000

Hint: Net present Value = NPV(of cash flows starting from period 1) – Cash flow at period 0

Q. Assuming the cost of capital to be 6%, 8%, and 10% for Project A, B and C respectively, find out the net present value of the investment using formula, PV function and NPV function.

Period	0	1	2	3	4
Project A	-100000	25000	35000	36000	40000
Project B	-250000	35000	60000	70000	120000
Project C	-350000	20000	-15000	110000	200000

Also find the project that has the highest present value.

Hint: Net present Value = NPV(of cash flows starting from period 1) – Cash flow at period 0

Q. A project requires an initial investment of Rs. 1, 00,000 and expects an annuity cash inflow of Rs 30,000 for the next 4 years. Assuming the cost of capital to be 8%, compute the net present value of the investment.

Hint 1: Annuity = Recurring payment of same value in each successive period

Hint 2: Net present Value = NPV(of cash flows starting from period 1) – Cash flow at period 0

Q. A company wants to buy a machine. The cost of the machine is Rs. 80,000. If the cash flows associated with the project over its life of next 5 years are as follows, determine if the machine should be bought or not on the basis of net present value method. Assume the cost of capital to be 8%.

Period	1	2	3	4	5
End of Year Cash Flow	15000	20500	28000	19500	9000

Hint 1: If the net present value comes out to be positive, the investment activity can be taken up.

Hint 2: Net present Value = NPV(of cash flows starting from period 1) – Cash flow at period 0

Q. A company wants to buy a machine. The cost of the machine is Rs. 80,000. If the cash flows associated with the project over its life of next 5 years are as follows, determine if the machine should be bought or not on the basis of net present value method. Assume the cost of capital to be 8%.

Period	1	2	3	4	5
Cash Outflow		2000	4000	25000	4500
Cash Inflow	15000	20500	28000	19500	30000

Hint 1: If the net present value comes out to be positive, the investment activity can be taken up.

Hint 2: Net present Value = NPV(of cash flows starting from period 1) – Cash flow at period 0

Q. Using NPV function, compute the net present value of the investment for the costs of capital 8%, 10%, 12% and 15%.

Period	0	1	2	3	4
Outflow	100000		10000		
Inflow		45000		36000	40000

Hint: Net present Value = NPV(of cash flows starting from period 1) – Cash flow at period 0

IRR(5)

Q. Assuming the following cash flows with respect to an investment, compute the internal rate of return after each period.

Period	0	1	2	3	4
Outflow	100000				

Inflow		25000	35000	36000	40000

Q. With respect to the following project proposals whose cash flows are given below, determine which project is the most lucrative using the internal rate of return method.

Period	0	1	2	3	4
Project A	-100000	25000	35000	36000	40000
Project B	-250000	35000	60000	70000	120000
Project C	-350000	20000	-15000	110000	200000

Q. A project requires an initial investment of Rs. 1, 00,000 and expects an annuity cash inflow of Rs 30,000 for the next 4 years. Find out the internal rate of return.

Hint: Annuity = Recurring payment of same value in each successive period

Q. A company wants to buy a machine. The cost of the machine is Rs. 80,000. If the cash flows associated with the project over its life of next 5 years are as follows, determine if the machine should be bought or not on the basis of internal rate of return method.

Period	1	2	3	4	5
End of Year Cash Flow	15000	20500	28000	19500	9000

Hint: If the IRR comes out to be positive, the investment activity can be taken up.

Q. A company wants to buy a machine. The cost of the machine is Rs. 80,000. If the cash flows associated with the project over its life of next 5 years are as follows, determine if the machine should be bought or not on the basis of internal rate of return method.

Period	1	2	3	4	5
Cash Outflow		2000	4000	25000	4500
Cash Inflow	15000	20500	28000	19500	30000

Hint: If the IRR comes out to be positive, the investment activity can be taken up.

XNPV(2)
Q. Compute the net present value of the following set of cash flows for an investment project.

Period	1/1/2045	22/7/2047	25/4/2048	6/6/2049	31/03/2050
Cash flows	-100000	25000	35000	36000	40000

Hint: XNPV

Q. A person makes in insurance policy for 20 years. The person is to make a periodic payment of Rs 5000 per annum and gets return of Rs 20000 every 5 years and Rs 40000 in the end. Find out the net present value of the insurance policy.

Hint: XNPV

XIRR(2)
Q. Compute the net present value of the following set of cash flows for an investment project.

Period	1/1/2045	22/7/2047	25/4/2048	6/6/2049	31/03/2050
Cash flows	-100000	25000	35000	36000	40000

Hint: XIRR

Q. A person makes in insurance policy for 20 years. The person is to make a periodic payment of Rs 5000 per annum and gets return of Rs 20000 every 5 years and Rs 40000 in the end. Find out the net present value of the insurance policy.

Hint: XIRR

Q. Assuming the following cash flows with respect to an investment, compute the modified internal rate of return after each period assuming that investment was taken as a loan at 8% rate of interest per annum and future cash inflows if reinvested will fetch a the rate of interest of 10% per annum.

Period	0	1	2	3	4
Outflow	100000				
Inflow		25000	35000	36000	40000

Q. A sum of money is deposited in a bank which compounds interest semi-annually. The amount at the end of 4 years is Rs 6333.85 and the amount became Rs 8023.53 at the end of 8 years. Find the money deposited and the interest rate.

Q. Ramesh has first purchased a house for Rs 20,00,000 and has made a down payment of Rs 15,000. He proposes to repay the balance in 25 years by monthly instalments at 9% per annum compounded monthly. Compute the components of principal amount and interest amount in each instalment. Create a graph about the manner in which these amounts change over time.

Hint: CUMIPMT, CUMPRINC

Q. An individual takes a loan from a lender on some terms and conditions. Compute the principal component and interest component paid by the person in n^{th} instalment. Also show that the sum of principal component and interest component is the same as the instalment amount.

1. Use the following sample format for the preparation of loan schedule statement.

Loan Details	
Amount of Loan	
Rate of Interest	
Duration of Loan	
Repayment Periodicity	
Particular n^{th} term/period	
Paid Part	
Interest part paid up till n^{th} term/period	
Principal part paid up till n^{th} term/period	
Outstanding Part	
Interest part after n^{th} term/period	
Principal Component after n^{th} term/period	

2. Assume the 'amount of loan', yearly 'Rate of Interest' and 'Duration of Loan' in the form of years on your own.
3. Assume 'Repayment Periodicity' on your own by selecting one value from four possible ways of repayments – Monthly, Quarterly, Half Yearly and yearly.
4. Choose a particular term/period from a list of permissible terms/period numbers
5. Compute the interest and principal amount components as positive values.

Hint: Temporary values can be created for effective number of terms and effective rate of interest for a single term, before computing the instalment amount. CUMIPMT, CUMPRINC

Q. M purchased a television paying Rs 5000 down and promising to pay Rs 200 every quarter for next 10 years. The seller charges interest at the rate of 12% per annum compounded quarterly. If M misses the first 10 instalments, what must he pay when the 11th payment is due to discharge his entire loan?

Hint: PMT, FV

Misc (1)

Q. Mr. X took a loan of Rs 80,000 payable in 10 semi-annual instalments, rate of interest being 8% p.a. compounded semi-annually. Find:

a. the amount of each instalment
b. Loan outstanding after 4th payment
c. Interest component of 5th payment and
d. Loan repaid after four payments

Hint: TBD

Q. An individual takes a loan from a lender on some terms and conditions. Compute the principal component and interest component paid by the person in n^{th} instalment. Also show that the sum of principal component and interest component is the same as the instalment amount.

1. Use the following sample format for the preparation of loan schedule statement.

Loan Details	
Amount of Loan	
Rate of Interest	
Duration of Loan	
Repayment Periodicity	
Particular term/period	
Interest Component in n^{th} term/period	
Principal Component in n^{th} term/period	
Instalment in n^{th} term/period	
Is instalment amount equal to sum of principal component and interest component?	

2. Assume the 'amount of loan', yearly 'Rate of Interest' and 'Duration of Loan' in the form of years on your own.
3. Assume the 'Repayment Periodicity' on your own by selecting one value from four possible ways of repayments – Monthly, Quarterly, Half Yearly and yearly.
4. Choose a particular term/period from a list of permissible terms/period numbers
5. Compute the principal amount, interest and instalment as positive values.
6. Compute the outcome of the question – 'Is instalment amount equal to sum of principal component and interest component?' as Yes or No.

Hint: Temporary values can be created for effective number of terms and effective rate of interest for a single term, before computing the instalment amount.

Q. A certain sum of money is invested at 4% compounded annually. The interest for the second year is Rs 25. Find out in which year the principal component of the instalment will become greater than the interest component.

Hint: IPMT. PPMT

Q. Assuming the following cash flows with respect to an investment, compute the modified internal rate of return after each period assuming that investment was taken as a loan at 8% rate of interest per annum and future cash inflows if reinvested will fetch a the rate of interest of 10% per annum. Find out the difference between internal rate of return and modified internal rate of return for this investment.

Period	0	1	2	3	4
Outflow	100000				
Inflow		25000	35000	36000	40000

Hint: IRR, MIRR

Q. An individual/company takes a loan from a lender on some terms and conditions. Prepare a loan/lease schedule statement by using the following instructions in spreadsheet software (e.g. MS Excel)

1. Use the following sample format for the preparation of loan schedule statement.

Loan Details	
Amount of Loan	
Rate of Interest	
Duration of Loan	
Repayment Periodicity	
Instalment	

Loan Schedule				
Period	Opening Balance	Interest Due	Instalment	Closing Balance

2. Assume loan amount (in Rs.) on your own
3. Assume the rate of interest (yearly) on your own
4. Assume the duration of the loan (in years) on your own
5. Make the periodicity of loan such that one of the four possible periodicities (Monthly, Quarterly, Half Yearly or Yearly) can be chosen.
6. Instalment is computed dynamically by taking the values of loan amount, rate of interest, and periodicity in to account.
7. The period column should compute period number (from 1 to N) dynamically, where N is the maximum period number. (You can also think of period number as instalment number)
8. Compute the opening balance, interest due, instalment, and closing balance for each period dynamically.
9. The worksheet should be generalized for all the basic inputs (loan amount, rate of interest and periodicity) i.e., all the entries of the loan schedule should be computed dynamically as the all the basic inputs are provided.
10. Extra cells/rows/columns can be used for computing temporary values.

11. Format different cells for a professional impact (Use the principles of financial formatting, alignment and bold for appropriate cells).

Q. An individual/company takes a loan from a lender on some terms and conditions. Prepare a loan/lease schedule statement by using the following instructions in spreadsheet software (e.g. MS Excel)

1. Use the following sample format for the preparation of loan schedule statement.

Loan Details	
Amount of Loan	
Rate of Interest	
Duration of Loan	
Repayment Periodicity	

Loan Schedule					
Period	Opening Balance	Interest Due	Instalment	Additional Amount Paid	Closing Balance

2. Assume loan amount (in Rs.) on your own
3. Assume the rate of interest (yearly) on your own
4. Assume the duration of the loan (in years) on your own
5. Make the periodicity of loan such that one of the four possible periodicities (Monthly, Quarterly, Half Yearly or Yearly) can be chosen.
6. Instalment is computed dynamically by taking the values of loan amount, rate of interest, and periodicity in to account.
7. The period column should compute period number (from 1 to N) dynamically, where N is the maximum period number. (You can also think of period number as instalment number)
8. Compute the opening balance, interest due, instalment, and closing balance for each period dynamically. The instalment of the subsequent months should automatically be changed if some month is paid in addition to the due instalment.
9. The worksheet should be generalized for all the basic inputs (loan amount, rate of interest and periodicity) i.e., all the entries of the loan schedule should be computed dynamically as the all the basic inputs are provided.
10. Extra cells/rows/columns can be used for computing temporary values.
11. Format different cells for a professional impact (Use the principles of financial formatting, alignment and bold for appropriate cells).

Q. An individual borrowed Rs.5,00,000 from a bank for a period of 10 years @ 12% p.a. to be repaid in equal quarterly instalments. The terms of agreement provide that the repayment can be rescheduled at the option of the borrower after paying 24 instalments. At the start of the 6th year i.e. after 5 years, the borrower exercised the option for the changed terms and conditions for the remaining tenure. The banker agreed to reschedule the repayment of loan on yearly basis by reducing the interest rate to 10% p.a.

1. Use the following sample format for the preparation of loan schedule statement.

Loan Details			
Original Amount of Loan		Rescheduled Loan Amount	

Original Rate of Interest		Rescheduled Rate of Interest	
Duration of Loan		Remaining Loan Duration	
Original Repayment Periodicity		Rescheduled Repayment Periodicity	
Original Instalment		Rescheduled Instalment	

Loan Schedule				
Period	Opening Balance	Interest Due	Instalment	Closing Balance

2. Assume loan amount (in Rs.) on your own
3. Assume the rate of interest (yearly) on your own
4. Assume the duration of the loan (in years) on your own
5. Assume the periodicities for both the terms (before and after the change) to be fixed
6. The loan schedule reflects the periods belonging to both terms (before and after the change)
7. The period column should compute period number (from 1 to N) dynamically, where N is the maximum period number. (You can also think of period number as instalment number)
8. Compute the opening balance, interest due, instalment, and closing balance for each period dynamically.
9. The worksheet should be generalized for all the basic inputs (loan amount, rate of interest and periodicity) i.e., all the entries of the loan schedule should be computed dynamically as the all the basic inputs are provided.
10. Extra cells/rows/columns can be used for computing temporary values.
11. Format different cells for a professional impact (Use the principles of financial formatting, alignment and bold for appropriate cells).

Q. A banker needs a worksheet that can prepare loan schedules for its borrowers so that the banker can show the borrowers as to how their loan amounts will be repaid. The worksheet should allow the banker to change the loan amount, loan period and periodicity for generating loan repayment schedules. As the banker provides a onetime facility to the borrower to change the rate of interest and periodicity over the entire time period of the loan, the banker also wants the worksheet to reflect modification in the loan schedule, if a borrower wants to exercise the option of rescheduling. Prepare a worksheet in spreadsheet software (e.g. MS Excel) for the banker using the following instructions.

1. Use the following sample format for the preparation of loan schedule statement.

Loan Details			
Original Amount of Loan		Rescheduled Loan Amount	
Original Rate of Interest		Rescheduled Rate of Interest	
Total Duration of Loan		Remaining Loan Duration	
Original Repayment Periodicity		Rescheduled Repayment Periodicity	
Original Instalment		Rescheduled Instalment	
Duration of Loan before rescheduling			

Loan Schedule				
Period	Opening Balance	Interest Due	Instalment	Closing Balance

2. Assume loan amount (in Rs.) on your own
3. Assume the rate of interest (yearly) on your own
4. Assume the duration of the loan (in years) on your own
5. Assume the periodicities for both the terms (before and after the change) can be changed and the banker should be able to select one of the possible periodicities (monthly, quarterly, half yearly, and yearly) for those.
6. The loan schedule reflects the periods belonging to both terms (before and after the change)
7. The period column should compute period number (from 1 to N) dynamically, where N is the maximum period number. (You can also think of period number as instalment number)
8. Compute the opening balance, interest due, instalment, and closing balance for each period dynamically.
9. The worksheet should be generalized for all the basic inputs (loan amount, rate of interest and periodicity) i.e., all the entries of the loan schedule should be computed dynamically as the all the basic inputs are provided.
10. Extra cells/rows/columns can be used for computing temporary values.
11. Format different cells for a professional impact (Use the principles of financial formatting, alignment and bold for appropriate cells).

Depreciation Rates

Q. A fixed asset e.g. a car had an expected like of 10 years. Assuming that the product was procured sometime in the middle of a financial year (e.g. in the month of Aug), compute the depreciation periods applicable on the product over its entire life span. Also compute the duration of each period in terms of years and months separately.

Q. There is a fixed asset whose initial cost, expected life (in years) and salvage value of the fixed asset is to be assumed on your own. Assume that each term/period of it expected life represents a complete 12 month period, compute the depreciation rate of the asset for a particular term (assumed on your own) as per the declining balance (DB), double declining balance (DDB) and sum of year digit method (SYD) methods.

Hint: The depreciation rate for DB and DDB method remain same for all the terms while depreciation rate for SYD is different for each term.

$$depreciation\ rate_{SLN} = \frac{100\%}{expected\ life}$$

$$depreciation\ rate_{DB} = IRR\ function$$

$$depreciation\ rate_{DDB} = 2 \times \frac{100\%}{expected\ life}$$

$$depreciation\ rate_{SYD} = \frac{term\ no\ in\ reverse\ order}{sum\ of\ term\ numbers\ of\ expected\ life\ (i.e.1+2+\cdots+N)}.$$

The term number is chosen in the reverse order here. It means for the 1st term, choose the last term number, for the 2nd term choose the second last term number and so on.

SLN(5)

Q. Compute the rate of interest applicable in case of straight line method depreciation of an asset whose initial cost, expected life and salvage value is given assumed on your own.

Hint: The depreciation rate SLN is for each term is as follows

$$depreciation\ rate_{SLN} = \frac{100\%}{expected\ life}$$

Q. Compute the depreciation amount for a particular term using the depreciation rate applicable in case of straight line method depreciation of an asset whose initial cost, expected life and salvage value is given assumed on your own. Assume that each term/period of it expected life represents a complete 12 month period.

Hint: The depreciation rate and depreciation value for SLN method for depreciation are as follows. Note that depreciation amount for all the period is same and hence uses initial cost

$$depreciation\ rate_{SLN} = \frac{100\%}{expected\ life}$$

$$\left(depreciation\ value_{n^{th}term}\right)_{SLN} = initial\ cost \times depreciation\ rate_{SLN}$$

Q. A mainframe computer whose cost is Rs 5,00,000 will depreciate to a scrap value of Rs 50,000 in 5 years. What is the book value of the computer at the end of third year if the straight line method of depreciation is used? Solve the problem using formula as well as excel function.

Hint: SLN;

Q. A machine whose cost is Rs 10,00,000 will depreciate to a scrap value of Rs 2,00,000 in 7 years. What is the book value of the computer at the end of 1st, 4th and 8th period if the straight line method of depreciation is used? Assume that the machine was procure in the 7th month of the accounting year. Solve the problem using formula as well as excel function.

Hint: SLN function with months;

Q. Prepare a depreciation schedule for an asset whose initial cost, life and salvage value are given by the user as inputs using straight line method.

Hint: Depreciation schedule includes book value, depreciation amount and depreciated value for each period.

DB(7)

Q. Compute the rate of interest applicable in case of declining balance method of depreciation for an asset whose initial cost, expected life and salvage value is given assumed on your own.

Hint: The depreciation rate DB is the same discount rate which reduces the initial cost of the asset (as present value) to its salvage value (as future value) over its life time (number of periods). Use Excel function RATE or goal seek for the following formula for computing the depreciation rate.

$$depreciation\ rate_{DB} = 1 - \left(\frac{salvage\ cost}{initial\ cost}\right)^{\frac{1}{life}}$$

Q. Compute the depreciation amount for a particular term using the depreciation rate applicable in case of declining balance method of depreciation for an asset whose initial cost, expected life and salvage value is given assumed on your own. Assume that each term/period of it expected life represents a complete 12 month period.

Hint: The depreciation rate for DB can be found by using the following formula or Excel RATE function

$$depreciation\ rate_{DB} = 1 - \left(\frac{salvage\ cost}{initial\ cost}\right)^{\frac{1}{life}}$$

The depreciation amount for nth term can be found by the following formula

$$\left(depreciation\ value_{n^{th}term}\right)_{DB} = opening\ value_{n^{th}term} \times depreciation\ rate_{DB}$$

Q. A mainframe computer whose cost is Rs 5,00,000 will depreciate to a scrap value of Rs 50,000 in 5 years. What is the book value of the computer at the end of third year if the reducing balance method of depreciation is used? Use the DB function as well as formula

Hint: DB;

Q. A mainframe computer whose cost is Rs 5,00,000 will depreciate to a scrap value of Rs 50,000 in 5 years. Assuming that the machine was purchased in the 4th month of the accounting year, what is the book value of the computer at the end of 1st, 3rd and 6th year if the reducing balance method of depreciation is used? Use the DB function as well as formula.

Hint: Use DB with month argument. The depreciation amount for n^{th} term can be found by the following formula

$$\left(depreciation\ value\ _{n^{th}term} \right)_{DB} = \frac{opening\ value_{n^{th}term} \times depreciation\ rate_{DB} \times months_{n^{th}term}}{12}$$

Q. A machine depreciates at the rate of 8% for the first two years, at 10% for next three years and then at the rate of 15% p.a. Find the value of the machine at the end of 10 years, if the value of the machine is Rs. 1, 00,000 initially. Find also the average rate of depreciation.

Hint: DB, RATE

Q. A machine depreciates at the rate of 10% for the first two years, at 7% for next three years, depreciation being calculated on the diminishing value. If the value of the machine be Rs 10,000 initially, find the depreciated value of the machine at the end of 5th years. Also find also the average rate of depreciation.

Hint: DB, RATE

Q. A machine costing Rs 75000 is depreciated at the rate of 10% p.a. for the first 5 years and then at 12% p.a. for next 3 years, both on diminishing balance basis. Find its book value at the end of 8th year. Using this also find average rate of depreciation.

Hint: DB, RATE

Q. Prepare a depreciation schedule for an asset whose initial cost, life and salvage value are given by the user as inputs using declining balance method.

Hint: Depreciation schedule includes book value, depreciation amount and depreciated value for each period.

DDB(4)

Q. Compute the rate of interest applicable in case of double declining balance method of depreciation of an asset whose initial cost, expected life and salvage value is given assumed on your own.

Hint: The depreciation rate DDB is double the depreciation rate of SLN is for any term and is as follows

$$depreciation\ rate_{DDB} = 2 \times \frac{100\%}{expected\ life}$$

Q. Compute the depreciation amount for a particular term using the depreciation rate applicable in case of double declining balance method of depreciation for an asset whose initial cost, expected life and salvage value is given assumed on your own. Assume that each term/period of it expected life represents a complete 12 month period.

Hint: The depreciation rate and depreciation value for SLN method for depreciation are as follows. Note that depreciation amount for all the period is same and hence uses initial cost

$$\text{depreciation rate}_{DDB} = 2 \times \text{depreciation rate}_{SLN} = 2 \times \frac{100\%}{\text{expected life}}$$

$$\left(\text{depreciation value}_{n^{th}term}\right)_{DDB} = \text{opening balance}_{n^{th}term} \times \text{depreciation rate}_{DDB}$$

Q. A mainframe computer whose cost is Rs 5,00,000 will depreciate to a scrap value of Rs 50,000 in 5 years. Assuming that the machine was purchased in the 4th month of the accounting year, what is the book value of the computer at the end of 1st, 3rd and 6th year if the double declining balance method of depreciation is used? Use the DB function as well as formula.

Hint: Use DB with month argument. The depreciation amount for n^{th} term can be found by the following formula

$$\left(\text{depreciation value}_{n^{th}term}\right)_{DDB} = \frac{\text{opening value}_{n^{th}term} \times \text{depreciation rate}_{DDB} \times \text{months}_{n^{th}term}}{12}$$

Q. Prepare a depreciation schedule for an asset whose initial cost, life and salvage value are given by the user as inputs using double declining balance method.

Hint: Depreciation schedule includes book value, depreciation amount and depreciated value for each period.

SYD(4)

Q. Compute the rate of interest applicable in case of sum-of-year-digit method of depreciation of an asset whose initial cost, expected life and salvage value is given assumed on your own.

Hint: The depreciation rate SYD is computed as follows. The term number is chosen in the reverse order here. IT means for the 1st term, choose the last term number, for the 2nd term choose the second last term number and so on.

$$\text{depreciation rate}_{SYD} = \frac{\text{term no in reverse order}}{\text{sum of term numbers of expected life (i.e.1+2+}\cdots\text{+N)}}.$$

Q. Compute the depreciation amount for a particular term using the depreciation rate applicable in case of SYD method of depreciation for an asset whose initial cost, expected life and salvage value is given assumed on your own. Assume that each term/period of it expected life represents a complete 12 month period.

Hint: The depreciation rate and depreciation value for SLN method for depreciation are as follows. Note that depreciation amount for all the period is same and hence uses initial cost

$$\text{depreciation rate}_{SYD} = \frac{\text{term no in reverse order}}{\text{sum of term numbers of expected life (i.e.1+2+}\cdots\text{+N)}}$$

$$\left(\text{depreciation value}_{n^{th}term}\right)_{SYD} = (\text{intial cost} - \text{salvage value}) \times \left(\text{depreciation rate}_{n^{th}term}\right)_{SYD}$$

Q. An asset initially costed Rs 10000. Assuming its salvage life to be 5 years and salvage value to be 3000, compute the amount of depreciation as per the SYD method using Excel function.

Hint: SYD;

Q. Prepare a depreciation schedule for an asset whose initial cost, life and salvage value are given by the user as inputs using SYD method.

Hint: Depreciation schedule includes book value, depreciation amount and depreciated value for each period.

VDB(5)

Q. Compute the rates of interest for all the terms if an assets is assumed to be depreciated using the VBD method. Assume the initial cost, expected life and salvage value of the asset on your own.

Hint: The VDB method automatically selects one of the DDB or SLN method depending on which method gives more depreciation for any term.

Q. Compute the depreciation amount and depreciated value for each period of the life of an asset whose initial cost, expected life and salvage value is assumed on your own. Apply VBD method of depreciation. Use explicit formula and Excel formula separately for computation.

Hint: The VDB method automatically selects one of the DDB or SLN method depending on which method gives more depreciation for any term. The VDB depreciation of a single n^{th} term can be found by choosing starting period as n-1 and ending period as n.

Q. Compute the depreciation schedule of an asset using the DDB method by using the Excel VDB function. Assume the initial cost, life and salvage value on your own.

Hint: If no_switch argument is set to true, it does not switch to SLN method even if the SLN depreciation is more.

Q. Compute the depreciation schedule of an asset using the SLN method by using the Excel VDB function. Assume the initial cost, life and salvage value on your own.

Hint: If factor is 0, the function computes SLN depreciation value.

Q. Compute the depreciation amount for few successive terms/periods (i^{th} term to j^{th} term) for an asset whose initial cost, expected life (in years) and salvage value of the fixed asset is assumed on your own. Use VDB method of depreciation.

Depreciation Projects

Q. An asset initially costed Rs 10000. Assume that the salvage life of the asset was 5 years and salvage value was Rs, 3000. Compute the depreciation amount using all the methods and find out which method is able to provide the maximum depreciation in the first year.

Q. Using all the methods of depreciations (i.e. SLN, DB, DDB, SYD and VDB) compute the depreciation rate and depreciation amount applicable for a fixed asset whose the initial cost, expected life (in years) and salvage value of the fixed asset is assumed on your own. Compute the information for all the terms/periods of its expected life. Assume that each term/period of it expected life represents a complete 12 month period. Also prepare a chart to show how different methods of depreciation differ from each other for an asset's value over its life time.

Q Compute the depreciation schedule (i.e. term no, opening balance, depreciation amount, depreciated value/closing balance) applicable for a fixed asset whose the initial cost, expected life (in years) and salvage value of the fixed asset is assumed on your own for any of SLN, DB, DDB and SYD methods which is dynamically selected from a list of methods. Compute the above assuming that the asset was procured sometime in the middle of a financial year, such that the first term/period of it expected life represents a partial year. Assume the month of procurement on your own by selecting the month name from a list of months.

Q. Compute the depreciation rate and depreciation amount applicable for a fixed asset whose the initial cost, expected life (in years) and salvage value of the fixed asset is assumed on your own using SLN, DB, DDB, SYD and VDB methods thorough in built functions for few terms/periods (i^{th} term to j^{th} term) of the its expected life. Compute the above assuming that the asset was procured sometime in the

middle of a financial year, such that the first term/period of it expected life represents a partial year. Assume the month of procurement on your own by selecting the month name from a list of months.

Q Compute the depreciation value schedule (i.e. term no, depreciation amount) applicable for many fixed assets whose the initial cost, expected life (in years) and salvage value are assumed on your own for each of the asset. At the same time, for each asset, the depreciation method is assumed by dynamically selecting from a list of methods having entries as SLN, DB, DDB and SYD. Compute the above assuming that the asset was procured sometime in the middle of a financial year, such that the first term/period of it expected life represents a partial year. Assume the month of procurement on your own by selecting the month name from a list of months.

Hint: Use the following format intuitively.

S No	Asset Name	Initial Cost	Salvage Value	Depreciation Method	Month in First Term	Term 1	Term 2	Term 3	…
					Totals				