

FINANCIAL MATHEMATICS Prepared by: J Wijerathne.

01. Find the simple interest and amount on Rs. 50000/- for 5 yrs. at 12% per annum.
02. Find the simple interest and amount on Rs. 40000/- for $3\frac{1}{2}$ yrs. at 14.5% per annum.
03. Calculate the principal on which Rs. 12000/- is the interest for 3 yrs. at 15% per annum simple interest.
04. Calculate the principal on which Rs. 17500/- is the interest for $3\frac{1}{2}$ yrs. at 12.5% per annum simple interest.
05. At what rate percent simple interest would Rs. 60000/- produce an interest of Rs. 27000/- in 3 yrs.
06. At what rate percent per annum would the simple interest on Rs. 80000/- be Rs. 35000/- in $3\frac{1}{2}$ yrs.
07. At what rate percent of simple interest would Rs. 45000/- amount to Rs. 40000/- in 5 yrs.
08. In what time would the simple interest on Rs. 20000/- be Rs. 18000/- at 15%.
09. In what time at simple interest would Rs. 80000/- amount to Rs. 115,000/- at 12.5% per annum.
10. What sum would amount to Rs. 87000/- in 3 yrs. at 15% per annum simple interest.
11. Find the amount and interest on Rs. 25000/- at 12% compound interest in 3 yrs.

12. Find the amount and interest on Rs. 40000/- at 14.5% compound interest in $4\frac{1}{2}$ yrs.
13. What principal would amount to Rs. 50000/- in 3 yrs. at 12% compound interest.
14. What principal would amount to Rs. 120000/- in $4\frac{1}{2}$ yrs. at 13.5% compound interest.
15. At what rate percent compound interest will Rs. 25000/- amount to Rs. 40000/- in 3 yrs.
16. At what rate percent compound interest will Rs. 50000/- amount to Rs. 90000/- in 5 yrs.
17. At what rate percent compound interest will a sum of money double itself in 5 yrs.
18. In what time will Rs. 50000/- amount to Rs. 80000/- at 12% per annum compound interest.
19. In what time will Rs. 40000/- amount to Rs. 100,000/- at 14.5% per annum compound interest.
20. In what time will a sum of money treble itself at 16.5% per annum compound interest.
21. Find the amount on Rs. 50000/- in 3 yrs. at 18% per annum, when the interest is added at the end of every ~~6~~ 6 months (i) month (ii) 3 months.
22. Find the amount on Rs. 40000/- in 5 yrs. at 12% per annum, when the interest is added at the end of every (i) 6 months (ii) 4 months (iii) 3 months (iv) 2 months (v) 1 month.

23. Find the amount on Rs. 25000/- in 3 yrs. at 15% per annum, when compounded (i) semi-annually (ii) quarterly (iii) monthly (iv) daily.
24. Find the effective interest rate equivalent to the nominal rate of 12% per annum compounded monthly.
25. Find the effective interest rate equivalent to the nominal rate of 15% per annum compounded (i) semi-annually (ii) quarterly (iii) monthly.
26. A company buys a computer for Rs. 150,000. If the computer depreciates at 12% per annum, what is the book value of the computer after 5 yrs., if the straight line method of depreciation is applied.
27. A company buys a printing machine for Rs. 800,000. If it depreciates at 12.5% per annum, what is the value of the printing machine after $4\frac{1}{2}$ yrs., if the straight line method of depreciation is applied.
28. A company buys a computer for Rs. 250,000/-. If it depreciates at 12% per annum, what is the book value of the computer after 5 yrs., if the reducing balance ^{method} of depreciation is applied.
29. A company buys a printing machine for Rs. 1.2 mn. If it depreciates at 14.5% per annum, what is the book value of the printing machine after $5\frac{1}{2}$ yrs. if the method of reducing balance is applied.
30. A company buys a computer for Rs. 500,000 and houses it in a room worth Rs. 200,000/-. If the computer depreciates at 15% (reducing balance) and the room appreciates (compound) at 10%, what is the book value of the computer and the room after 5 yrs.

31. Find the present value of Rs. 50000/- that will be received in 3 yrs, at 18% discounting rate.
32. Find the present value of Rs. 100000/- that will be received in 5 yrs, at 13.5% discounting rate.
33. What is the present value of Rs. 250,000/- that will be received in $7\frac{1}{2}$ yrs, at 16.5% per annum discounting rate.
34. The initial investment for a certain business is Rs. 50000/-. The estimated incomes at the end of the first, second and third yrs. are Rs. 15000/-, Rs. 20000/- and Rs. 25000/- respectively. If the discounting rate is 12%, find the net present value and decide whether this project is profitable.
35. The initial investment of a project is Rs. 250,000. The estimated incomes at the end of 3rd, 4th and 5 years are Rs. 90000/-, Rs. 100,000/- and Rs. 110,000/- respectively. Find the NPV at 14.5% discounting rate and decide whether this project is profitable.
36. The cash flows of a project are as follows.

Year:	0	1	2	3	4	5
Cash Outflow	350	-	-	-	-	-
Cash Inflow	-	80	100	120	140	150

(All the cash flows are in Rs' 000)

Calculate the NPV of this project at 12% discounting rate and decide whether this project is profitable.

37. It is estimated that an investment in a new project will cause the following cash flows.

Year	0	1	2	3	4	5	6
Cash flow (Rs '000)	(250)	(150)	100	110	120	130	140

Calculate the N.P.V at 12.5% discounting rate and decide whether this project is profitable.

38. A company can purchase a machine now for Rs. 800000p. The company accountant estimates that the machine will contribute Rs. 150,000 per annum, at the end of every year to profits for 5 yrs, after which time it will have to be scrapped for Rs 250,000p. Find the NPV of this project, if the discounting rate is 8% per annum.

39. A Company is wondering whether to spend £18000 on an item of equipment in order to obtain cash profits as follows.

Year	1	2	3	4
Profit (£)	6000	8000	5000	1000

If the company requires a return of 10% per annum, is the project viable. Use the NPV method. (Ans. 1494.31)

40. ABC Ltd. is considering whether to spend £5000 on an item of equipment. The cash profits from the project would be £3000 in the 1st yr. and £4000 in the 2nd yr. Is the investment worthwhile, or viable at 15% per annum discounting rate. (Ans: NPV = £5633.27).

41. What is the future value of a due annuity at the end of 5 yrs, if Rs. 5000/- is deposited at the beginning of every year into an account earning 12% compounded annually.
42. What is the future value of an annuity at the end of 10 yrs. if Rs. 10000/- is deposited into an account at the beginning of every year earning 14.5% per annum compounded annually.
43. What is the future value of an annuity at the end of 5 yrs. if Rs. 1000 is deposited at the beginning of every month into an account earning 12% per annum compounded monthly.
44. What is the future value of an annuity at the end of 15 yrs. if Rs. 2500/- is deposited into an account at the beginning of every month earning 18% per annum compounded monthly.
45. What is the present value of an annuity that pays Rs. 10000/- per annum at the end of every year for 10 yrs, if the discounting rate is 12%.
46. What is the present value of an annuity that pays Rs. 5000/- per month at the end of every month for 5 yrs. if the discounting rate is 18%.
47. What is the P.V. of an annuity that pays Rs. 25000/- per annum, at the end of every year for 5 yrs. if the discounting rate is 15%.
48. What is the P.V. of an annuity that pays Rs. 2500/- per month at the end of every month for 10 yrs. if the discounting rate is 15%.

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